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Tropical Life:

A Monthly Journal devoted to the Interests of those living, trading, holding property, or otherwise interested in Tropical and Sub-Tropical Countries.

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The Tropical Exhibition.

TO BE HELD AT OLYMPIA IN JULY, 1909.

EVERYONE who has seen it, is congratulating Mr. Staines Manders on the extremely attractive preliminary prospectus that he has recently issued to call attention to the above exhibition, and to show how, under the various sections, the mind and body in the immediate future, and one's general prosperity later on, can be greatly benefited by every reader of TROPICAL LIFE taking an active part in the Travel and Tropical Exhibition, and getting their friends to do the same.

There never was a time when the trade of this country and the commercial future of the Empire at large was in a more critical state. The Board of Trade figures to the end of December last show a decrease in imports of £52,667,219, or 8·15 per cent.; in exports, £48,815,504, or 11·45 per cent.; and in re-exports, £12,276,515, or 13·3 per cent. It is at times such as these that a single decisive step forward ensures success. Support the Tropical Section of this Exhibition, and you, for one, will be taking that decisive step forward—and for this reason. The trade of all the leading manufacturing centres is seriously depressed, trade has been over-boomed, and over-production ensued, with the result that short-time or total closure has been the order of the day, and a large percentage of well-trained as well as casual workmen thrown out of employment.[1] This most unsatisfactory state of affairs can only be remedied by opening out new markets. New markets cannot now be found by just trotting round the world, as in the old days. Store-keepers abroad tell you that if customers, *i.e.*, actual buyers, were as common as commercial travellers, there would be but little to grumble at. Unfortunately, they are not. Nowadays there are too many sellers and too few buyers. The Tropical Exhibition means to remedy this state of affairs, and in this way.

Whilst in America and Europe people are shamefully overcrowded, and more people live in a single room than in a square league on the other side, vast tracts of land in our own Colonies and elsewhere are crying out to be cultivated. If this land were developed, the individual wealth of those stationed on it would be increased, and at the same time so would the buying capacity of the world at large. Thus would be created an absolutely fresh demand for machinery and manufactured goods, as Borneo and Malaya, British Guiana and other centres have been

[1] Returns relating to over 600,000 members of trade unions show that the mean of the percentages of members returned as unemployed at the end of each month of 1908 was 7·8, as compared with 3·7 in 1907. The fluctuations in the percentages of unemployed in the period 1898-1908 are: 1898, 2·8; 1899, 2·0; 1900, 2·5; 1901, 3·3; 1902, 4·0; 1903, 4·7; 1904, 6·0; 1905, 5·0; 1906, 3·6; 1907, 3·7; 1908, 7·8. Prices (*i.e.* the cost of living), meanwhile, are 5 per cent. higher than they were during 1901-1905.

doing during the last five or ten years. With the help of our various Colonial Agent-Generals and of the South American, Mexican, and other Governments, the Tropical Section can show visitors to Olympia in July not only where land is to be obtained, but how and what to plant on it; and perhaps most important of all, how to sell the produce when obtained. The last is the most difficult of all problems, as a rule to solve, but at a Travel, Sports, and Pastimes Exhibition you will have just the class of customer you want. The Exhibition will, in fact, if properly supported, bring producers and buyers together under one roof, and a large volume of business will ensue. We hope, therefore, all our readers will do their utmost to support us.

The merits of the different kinds and growths of tea are not half realized by the public over here, even the correct method of making is but indifferently known. The splendid staying powers of coffee, when properly prepared, have only to be demonstrated to travellers to make its consumption increase by leaps and bounds. The other day some £30,000 or more was spent to advertise the advantages of currants. We will do immense good to this important item in Greece's trade for a hundredth part of that sum. Bananas have still to be popularized among those whose travels or work make an exceptional call on their staying powers. A judicious and inclusive show of the various kinds of banana and banana products, as flour, dried bananas, *comfiture de banane*, banana liqueur, banana as a vegetable, &c., would enable the resident in England and the traveller abroad to be educated up to the food possibilities of this fruit, which is met with all through the tropical and sub-tropical zone —that is, wherever travellers like to go.

Tea, coffee, currants, bananas—the consumption of these four articles, and many others, can be greatly benefited and their sale increased, if the countries that produce them will liberally support the Tropical Section of the Travel Exhibition, and so help us to make their benefits known. Through that we shall also increase the buying capacity of the producers, and improve the demand for manufactured goods from our factories.

WE wish to call particular attention to the "Cacao Cultivation" (No. XIV.) notes this month on insect pests, as they are from the pen of Mr. Hinchley Hart, F.L.S., &c., the well-known cacao authority in Trinidad, who has had twenty-five years' experience in the study of these scourges of the cacao estates. These notes will be concluded in the February issue, and anyone wishing to go further into the matter should write to the author, whose address is Coblentz Avenue, Port of Spain, Trinidad, West Indies.

His remarks give not a few new facts which have an important bearing on the hygiene of cacao estates, especially the power of growth of the spore of *Diplodia*, which can grow in a single hour—that is, can cause infection in an hour. The matter is fully dealt with, and we shall be only too pleased to receive, and, if possible, publish other subscribers' remarks on this important matter of cacao pests. When the February issue is in the hands of our readers they will also be able to realize how strongly Mr. Hart's experience confirms our statements in this month's leader on the necessity of thoroughly cultivating and nourishing the soil and the trees, if they are to be kept free from disease. In two cases where this is particularly marked we have quoted the sentences as a footnote.

Central American News.

TRANSPORT FACILITIES BADLY NEEDED.

IN Guatemala there are large forest areas, with over sixty species of rare hardwoods, available for commercial purposes, but, except cedar and mahogany, very few, if any, of the other timbers are shipped. Rubber is the fourth item on the Republic's export list. Lately they have started the planting of rubber, and some attention, writes Mr. Robert Wilson in *Dun's Review*, is being given to the preservation of the old trees. The soil on the Caribbean coast in many places is peculiarly adapted to the raising of rubber, and shipments will show a marked increase. Some 376,000 lb. were exported in 1906. Wire fencing and agricultural implements are among the regular imports.

The same writer, when reporting on the resources of Spanish Honduras, says, that the soil is particularly suited for the raising of bananas, cacao, rubber, cotton, &c. Analysis shows it to consist of clay 40 parts, sand 52 parts, lime 3 parts, humus 5 parts. The bananas of Honduras, he tells you, rank very high, and the latest returns available show that 4,226,567 bunches were exported during the twelve months. Honduras is undoubtedly a country which has splendid opportunities, considering its size, but it can never prosper until the vexed question, now apparently elevated to the position of an international one, of its internal transport is settled. There are only 56 miles of railway, and the possibility for a Decauville or Koppel light railway, until this ridiculous quarrel is settled, ought to be rosy. With the exception of a few private banana roads, not a single mile of railroad has been laid within the Republic for upwards of thirty-five years.

As regards bananas, they form the chief article of export. In Honduras the finest of fruit is produced. The volume of her production to the acre is in excess of all other countries, as shown by the average yield per acre of the leading countries producing this fruit, which is as follows: Honduras, 377·4 bunches, Mexico 290, Jamaica 288, Guatemala 267·5, Costa Rica 250, Nicaragua 246·2. Costa Rica's production of bananas now far exceeds her coffee production. Over one hundred steamers are to-day engaged in this business in the Caribbean, and new companies are going in all the time. Latin America certainly offers great inducements for light railway and motor-boat engineers to push their machines, for they are badly needed. The past decade, says *Dun's Review*, has witnessed a remarkable industrial expansion in Latin America. In 1907 Latin America's exports amounted to $1,140,260,000, and her imports to $912,095,006. Here is a trade of $2,052,355,000, and these are royal figures. Most of these countries are in the first steps of development. In none of them has railroad construction work passed the primary stages; in most of them travel is still largely by mule and canoe. The possibilities for trade in all of them are enormous, and it would not be at all surprising if these figures are doubled within another ten years. In 1907 the foreign trade of Central America alone approximated $64,000,000.

AS TROPICAL LIFE is very strong in Latin America, and prints both advertisements and matter in Spanish or Portuguese, as well as in English, so as to be read in the vernacular, manufacturers and others anxious to push their connections throughout Latin America should make a point of advertising in our columns, and so secure a larger share of this most remunerative and rapidly increasing trade.

Cacao Cultivation. No. XIV.

STUDIES IN CACAO DISEASE.

By J. HINCHLEY HART, F.L.S.

IN this present article there is no intention to create a scare or to lead planters to become unduly anxious for their cultivation, but merely to present actual facts which should be known to everyone interested in the Cacao industry. There can be no doubt, however, that the destructive microscopic parasites causing disease in cacao are plentiful and persistent, and that the amount of damage they are capable of causing is not yet fully recognized or realized. Among these diseases, one of the most prominent is that described in Stockdale's pamphlet as causing "brown rot" of the pod, and "die back" of the branches. This fungus is a "facultative parasite," or one which, though at first a "saprophyte," or grower upon dead matter, can and does afterwards become a very destructive parasite. It is described by Tubeuf, Howard, Stockdale, and others as bearing two kinds of spores, by the growth of which it spreads rapidly—how rapidly will be seen later. The first is one-celled and "hyaline," or colourless, while the second is brown in colour and once septate or divided into two cells, the latter being the mature stage of the former. These spores can both germinate on any wound or abrasion of the cacao tree. Stockdale records that "Howard's experiments pointed to this fungus being a wound parasite, and capable of affecting sickly trees." This fungus is scientifically known as *Diplodia cacaoicola P. Henn.* Recent experiments show that the hyaline spore does not germinate so quickly as the mature form, and grows from one point only until it approaches maturity, when it may grow from two points. The mature spore, however, produces growth from each of its cells, at or about the same time. The rate of growth made in our cultures of the two forms is as follows: For the hyaline or immature spores, one hour fifty-five minutes, while the mature spores have germinated in a single hour. This result differs, however, from Howard's, which is possibly to be accounted for by a difference in the medium (culture fluid) used in the experiments. I am not aware what was used by Howard, but that used by the writer is made from material of a half-ripe pod. This is first pounded to a pulp, which becomes mucilaginous when mixed with water. The material is then strained through fine cloth, and the resultant liquor is boiled and allowed to cool. By this time it has lost its mucilaginous character, and has assumed the colour of brown sherry. It is then filtered and afterwards sterilized in flasks, and when cool is ready for use, and drop and tube cultures can readily be made by infecting it with a few spores of either form. It has been found that cacao pods can readily be inoculated by inserting a minute quantity of the spores into a small cut, that the disease rapidly destroys the pod in a few days, and that a heap of empty pods when infected will rapidly produce myriads of spores. Specimens have recently come to hand which show that this disease is present in some pods which to the ordinary observer appear perfectly healthy. It has been found in the branches of trees of fairly vigorous growth, and it has been found in the branches, stems, and roots of young trees three to four years old, which are said to have died from "root disease." In the pods the presence of the pest is generally discovered by the appearance of brown spots which precede the rot, but this is not always the case, as pods apparently sound will develop in a damp chamber the characteristic fructifications of the fungus. In "root disease" the first indication of mischief is shown by a yellowing and rapid drooping or wilting of the leaves, on the appearance of which the damage is complete, and the tree rapidly becomes dead and dry. The fungus, however, can be found by placing pieces of the wood and bark in damp chambers, when the "pycnidia," hitherto unseen under the bark, develop and discharge the spores in spiral or contorted gummy threads, which, though white when first exuded, rapidly become dark brown or nearly black as they assume the mature two-celled form. In the roots of trees lately examined, there was strong evidence that young trees had become infected through cutlass wounds made in the stems just at the surface of the ground by workmen when "brushing" or "billing" down the tall weeds which flourish in young plantations. Certain mites were noted during our studies which carried some of the spores attached to the hairs of their bodies, showing the possibility of transferring spores from one point to another by insect movement.

(*To be continued.*)

Changes at the West India Committee.

SIR NEVILE LUBBOCK having retired from that position, we congratulate the West India Committee in having persuaded Sir Henry Davson to accept the Chairmanship of that important incorporated body. With Sir Henry Davson on the bridge, and Mr. Aspinall at the wheel, the Committee can, and we feel sure will, do good work in developing all and every industry that can be run with success in these rather backward, but very fertile centres. Sir Henry, being a British Guiana man, we hope that strenuous efforts will be made to bring out this most comely, but decidedly retiring, colony, which, whilst possessing great possibilities, needs encouragement to develop them. Up to now we have not heard who is to succeed Sir Henry Davson as Deputy-Chairman. It would be well to appoint a comparatively young man, as Mr. Mitchell-Thomson, M.P. Perchance, Mr. R. H. McCarthy (who has lately retired from the post of Collector of Customs in Trinidad) would accept it. Mr. McCarthy's views for developing the West Indies, especially their commercial side, and to make them the the shipping *entrepot* of Central America, with Port of Spain (Trinidad) as the Hong Kong of Latin America, commend themselves to us, as emanating from one whose ideas and knowledge on the subject have been carefully and gradually matured, and so, given the chance, are capable of greatly benefiting the West Indies and the Empire at large.

SOME of those employed in rearing tropical foliage and flowering plants for decorative purposes have done well over the *début* of seventeen-year-old Miss Marjorie Gould. The function to celebrate this event was held the other day at New York's well-known and luxurious £2,000,000 hotel, the "Plaza," the first floor of which, the correspondent of the London *Daily Telegraph* tells us, was transformed for the occasion by a big army of decorators and artists. Huge Australian ferns, especially imported from the Antipodes, made verdant avenues, and over 1,000 Kentia palms from the South Sea Islands gave a vividly tropical tone of iridescent green to the rooms and corridors of the vast suite, which were garlanded with the contents of 180 crates of Alabama smilax, while beauty roses, orchids, and exotic lilies were strewn about as if they were vulgar dandelions raked from the field.

The Cult of the Coco-nut.

WHAT THE PHILIPPINES TEACH US ABOUT DRYING.

SINCE, writes Mr. Herbert S. Walker in the *Philippine Journal of Science*, the quick and thorough drying of copra has been shown to be of such vital importance in order to insure the production of a pure (*i.e.*, a good keeping) oil, an investigation of various methods of copra drying has been made, not only those common in the Philippine Islands, but also those used in other countries.

The simplest and most primitive mode of drying copra is to expose the nuts, cut in halves, to the action of the sun during about five days. A drawback to this method is its exceeding slowness, thereby not only causing the planter loss of time and money, but should, as with cacao, a sudden rainstorm come on, or a succession of rainy days be encountered, mould and bacterial growth may appear, and the copra be spoilt. Even under favourable circumstances it seems doubtful whether the copra ever becomes sufficiently dried to turn out satisfactorily at the "consumer's" factory.

Copra dried by laying the half-nuts, face downwards, on a bamboo grating over a slow fire of coco-nut husks, although cheap and comparatively rapid, has the disadvantage of yielding a dark-coloured product which has a smoke-like taste and odour. Such copra also tends to have too much moisture left in it, on the average more probably than that which has been dried in the sun.

Drying by means of a hot-air chamber, as is or was extensively used for drying copra in Ceylon, is said to give a pure light-coloured product. The chamber used is apparently the well-known fruit-dryer, with wire shelves one above the other. But here, the same as with cacao, it was found that the lower shelves, to insure an even drying, had to be constantly exchanged with those at the top, a method that loses heat, and is trying, cumbersome, and dangerous to those handling them. The less completely dried copra in the upper trays also is inclined to become slightly "soured." "For practical use," sums up Mr. Walker, "a dryer should therefore be equipped with some sort of a mechanical carrier, which would constantly introduce fresh coco-nut meat at the coolest part of the machine, and then bring it slowly down towards the hottest portion."[1] Compared with the other processes mentioned. the time a rotary dryer takes to extract the moisture is ridiculously small, viz. :—

Method.	Time.
Sun	5 days
Grill (over bamboos)	10 to 12 hours
Hot-air chamber	3½ ,, 4 ,,
Rotary hot-air process	2 ,, 3 ,,

The quality of the copra produced by the hot-air chamber or shelf system is said to give a superior meat, being perfectly white, dry, of pleasant smell and taste. For oil-making purposes, however, Mr. Walker claims that the rotary apparatus, since it lends itself to a continuous process and requires considerably less time, specially recommends itself, although its product does not present quite so pleasing an appearance. This, of course, referred to the rather crude apparatus[2] used in the Philippines; the dryer designed for Messrs. Bridge should turn out a copra equal in all ways to the shelf-dried article.

In face of Mr. Walker's notes, we shall certainly persevere with our experiments for copra-drying, and shall be glad to collaborate with our readers on the subject.

(To be continued.)

[1] This is exactly what the machine we designed for Messrs. David Bridge and Co. will do. At the time we had not read these notes of Mr. Walker. Had we done so, we should naturally have called attention to them a year ago when first describing the "Hamel-Smith" Rotary Dryer. [ED. *T.L.*].

West African News.

MARKED SUCCESS OF THE COOMASSIE SHOW.

TROPICAL LIFE *Friends to the Front.*

(By our Special Correspondent at the Gold Coast.)

THE Show was opened by His Excellency the Governor, at 9.30 a.m., on December 15th, and everything went off remarkably well. There were no hitches, and everyone seemed pleased and greatly interested. The success of the opening ceremony and the subsequent proceedings reflected the greatest credit on the hard-working Secretary, Mr. Main, who carried out his onerous duties in a most business-like and tactful manner.

The Show proved a great success. It would have done credit to an agricultural show in Europe. A large number of the native chiefs from the northern territories and nearly all the principal chiefs in Ashanti were present. They were all marched round the Show and the grounds, and the various products, their uses, and the methods of preparing them, explained. The chief centres of attraction in this tour were Messrs. Cadbury's exhibit, that of the Agricultural Department, and the cotton ginning and baling machines; each in their turn received the greatest amount of attention, and it was hard work answering all the questions. The exhibits were, on the whole, very good; cacao was, considering its importance, perhaps the poorest in proportion. The exhibits of rubber, however, made up for it, for they were excellent,[3] samples of rubber made by various processes being included, and it really was quite difficult to judge which was the best, as they ran one another exceedingly close.

The Agricultural Department had a neat and most attractive little stall, well furnished with exhibits. The Hardy Patent Pick Company are to be congratulated on the very complete collection of agricultural implements that they sent over. Their stall, as well as the matchets or cutlasses shown by your old friends, Messrs. Robert Mole and Sons, received great attention. These firms should do well in the future, if not immediately, through their forethought and enterprise in making a point of being so fully represented. I was sorry to see that you were unable to induce any of your spraying machine friends to send over samples; they would have done well if they had been represented. The Basle Mission

[2] A galvanized iron pipe, 20 cm. (7¾ in.) in diameter, by 6 metres long, set-up on wheels, and connected with a small electric motor, so that it could be made to revolve at any desired speed. Four strips of angle-iron, extending throughout the length of the pipe, served to keep the moist copra in constant motion during the time of drying.

[3] We have on more than one occasion already called attention to the splendid quality of the rubber sent over from the Gold Coast, especially some prepared by Mr. Evans, and exhibited at the Franco-British and the Rubber Exhibitions.

Factory had quite a nice exhibit of spraying machines, interspersed with rubber knives, watering cans, &c. Messrs. James Carter and Sons had a magnificent display of vegetables and flower seeds, which attracted considerable notice.

I understand Messrs. David Bridge and Co.'s rubber machinery plant, including the washer, presses, and drying-house were to have been included but arrived just too late, though under the superintendence of Mr. John Bridge, record time was made in getting everything ready. It is, however, as good as "on show," being fitted up at a factory, where it appears to be doing good work, and we are all watching its progress with interest. The machinery cost, I am told, over £1,000, and is capable of turning out first-class rubber. With such a machine in our midst, rubber from this part of the world will play a more leading *rôle* with manufacturers on the other side.

Generally speaking, things look promising for the Colony. We have done fairly well during 1908, and things will further improve as soon as the railway reaches the agricultural district. At present everything seems "hanging fire" on account of transport difficulties. Suitable machinery and adequate rail and river transport would work wonders.

The makers of spraying machines on your side, and in America, are certainly very slack, or else quite unable to realize the importance of this market as a buying centre. They have missed a splendid opportunity of showing, practically free of cost to them, the advantages of their respective machines to the officers of the Agricultural Department of this Colony, and so have helped to push their sale where they are already badly needed, and will be more so in the near future. I noticed, however, that the German firms were not so slow to make use of their opportunities; the Basle Mission Factory had some spraying machines on show, and will, undoubtedly, do a good trade with them.

As to cacao, we have produced very much more than last year, but the full increase will not show in the figures for 1908, as difficulty is experienced in getting the stuff down to the coast, so probably a large quantity will not be shipped until the New Year.[1]

The other day I was up at the Botanic Gardens. The cacao trees there were bearing magnificently. I am told on good authority that 20,228 pods were picked off 279 trees between July and the end of November, and that there is still a good number to be picked. This, I make it, will work out at something like 7 or 8 lb. of dried cocoa a tree for the year. If correct, it is a wonderful yield. It is a good thing for the rest of the cacao-producing world that this, or even the half of it, is not the average yield throughout the Colony. If it were we should not have stopped at 100,000,000 lb. this year, instead of, perhaps, 25,000,000 or 30,000,000 lb. The yield at the Gardens, it should be remembered, is produced on poor soil. I consider that the advantage shown over other parts of the Colony is simply due to careful cultivation and regular planting, giving sufficient light and air to the trees.[2]

[1] Elsewhere we call attention to the unexpected falling off in the Gold Coast shipments since May, when they showed 100 per cent. increase over 1907.

[2] In spite of the excellent cacao crop, we are very glad to see our contemporary the *African Mail* is urging the Government and the chiefs to advise the farmers and landowners not to destroy their oil-palms to make room for cacao. The West Indies have suffered so terribly from trusting in the past to a single industry, that West Africa will do well to take a warning from them.

The Consumption of Tea in the United Kingdom.

To the Editor of TROPICAL LIFE.

SIR,—As you have already explained, it was not I who raised any question as to the drinking of China tea being conducive to lunacy. But what can be more ridiculous than to suggest that the public are not influenced by the number of cups of liquor obtainable from a pound of tea? Even the Secretary of the China Tea Association will hardly care to deny that, weight for weight and price for price, the China leaf will only produce liquor of half the strength obtainable from the richer growths of India or Ceylon. Probably none but a hopelessly extravagant housewife, on ascertaining this, would continue to use the weaker leaf, for she would at once argue that if she did not want a stronger liquor she could obtain her desire by using half the quantity of the stronger leaf; and if she had any inkling of the insanitary conditions under which the China tea had been made, she would take good care never to have another grain of it in her house again. It is all nonsense to talk about the superior qualities of the finer grades of China tea. There is not anything more delicious than some of the really fine "vintage" teas from Ceylon and Darjeeling.

There is a very interesting article in the Christmas number of the *Times of Ceylon*, just to hand, from the pen of Mr. Kelway Bamber. He is an acknowledged authority on the chemistry of tea, and has, I believe, studied the question first hand in China. He points out that it is really owing to the insanitary methods of manufacture by the Chinese that so many of their teas contain a deficiency of tannin. The damp conditions of storage allow the partly manufactured tea to absorb from 10 to 14 per cent. of moisture, favouring the rapid development of one or more moulds, which partially decompose the constituents, including the tannin, with the production of non-volatile bodies of another taste altogether. It appears, therefore, that the deficiency of tannin in China growths is really one of the defects of manufacture, and I fancy our China friends will have a hard row to hoe before they can explain these to the satisfaction of the British public.

I am not surprised that Mr. Lawrence does not care to controvert my figures directly except as regards the caffeine quantity. My copy of Dr. Tebb's pamphlet gives the averages of caffeine present in the twelve samples of Ceylon and thirteen of China tea respectively as 3·68 per cent. and 2·40 per cent., which show the proportion of 153 to 100. But although I have made repeated applications to the author and his publisher for an original copy of the pamphlet, it has as yet been in vain, and I had to get a hand-written copy made at the British Museum. The average of the detailed figures as I have them shows that the Indian caffeine contents should be 2·84 per cent., the Ceylon 2·68 per cent., and the China 2·40 per cent., as against the figures which are given in Table I. of 2·84, 3·68, and 2·40 per cent. respectively, and it is therefore evident that there is either a misprint in the original or a mistake on the part of my copyist—most probably the latter. But, even so, the caffeine contents of the China growth are still the least, as the Indian and Ceylon teas exceed them by 12 and 18 per cent. respectively.

I am, Sir, &c., STUART R. COPE,
Secretary Anti-Tea Duty League.

Notes on Present Condition of the Castilla Rubber Industry.

By Dr. PEHR OLSSON-SEFFER.

ON the American continents from about 22° N. latitude in Mexico to nearly 12° S. in Peru, *Castilla elastica* (Cervantes) and related species grow wild in the primeval forests. From the time when rubber obtained from this tree was first used for the purpose of impregnating cloth to render it waterproof, that is, during the Spanish conquest of Mexico, as chroniclers inform us, *Castilla* has been the object of a diligent search and subsequent destructive treatment.

Rubber prepared from the latex of species of *Castilla* appears in the market under the general term "Centrals." The crude methods of preparation have resulted in a more or less inferior product, which has commanded a comparatively low price, but even under such conditions the collecting of rubber has proved a very lucrative undertaking.

In its natural state the Central American rubber tree grows at a low elevation, seldom reaching higher than 2,000 ft. It prefers the moist low lands and river banks, but carefully avoids swampy or wet ground. *Castilla* is decidedly a forest tree, but it favours small openings in the dense tropical forest, where it forms small clusters of a dozen trees or less. The natives eagerly search for these trees, and tap them frequently. The rubber collector or "hulero" seldom taps a tree less than 25 in. in girth, at 3 ft. from the ground. He considers that it does not pay to extract the rubber from smaller or younger trees.

The original native method of tapping is as follows: The underbush is cleared away around the trunk, and then a gash some 3 to 4 in. long is made in the bark with the machete, and a piece of a leaf is inserted to serve as a spout along which the latex runs. Incisions are generally made at an angle of 45° and extending about three-fourths of the circumference of the tree. About 2½ ft. higher another incision is made, the latex flowing down the side of the trunk into a gourd, which is used as a collecting vessel.

The latex is then spread on the long leaves of an aroid, a species of *Calathea*, called by the natives "oja blanca." When the leaf is evenly coated the rubber is allowed to dry, and a new thin layer of fresh latex is added. This is kept up until the rubber is ¼ in. thick, when several sheets are piled on top of each other, and pressed sufficiently to adhere. The leaves are then stripped off, and a slab of rubber is obtained, which is ready for marketing.

Another, somewhat more recent, method of preparing rubber is generally practised by the native collectors. A quantity of "bejuco," from the Morning Glory vine (*Ipomæa bona nox*), is pounded and mixed with water. This liquid is added to the latex, which quickly coagulates. The rubber thus obtained is very wet, and the "planchas" or slabs are porous, with large cavities containing the watery beer-like mother liquid, which soon becomes decomposed and gives the rubber a stinking smell.

Certain varieties of *Castilla* do not produce latex in sufficient quantities to permit of its being collected in vessels. It is then left to dry on the tree, and the scrap is later pulled off the wounds. Whatever method of preparation is employed, the native rubber collector considers that he has done a good day's work when he has tapped a dozen trees.

From the nature of the incision made with the machete it follows that the middle of the cut reaches considerably deeper than the ends. As a matter of fact, it usually penetrates into the wood. The native collector is mainly interested in his monetary gain, and he does not take much care to preserve the wild supply. The frequency of tapping and the bad system of making incisions injure the trunk, and often kill the tree. In consequence, it can be said that in every locality rubber is extracted at the cost of the tree itself. That the wild trees are decreasing in number is evident also from the fact that nearly all of them are small in size, the larger ones having been cut down or destroyed by too severe tapping. This holds good throughout the entire area in which *Castilla* is found growing.

On the supposition that rubber growing on a commercial scale would prove profitable, it was commenced over thirty years ago in Mexico. Those who contemplated planting naturally chose the indigenous tree, *Castilla*, found growing at their very doors. Although *Castilla* culture in Central America was undertaken on a small scale only, planters soon found that it was a commercial success, and they have not had any reason to regret their choice of tree, except in cases where necessary precautions in selection of soil and other natural conditions have not been exercised. In such instances it is doubtful whether any kind of rubber tree would have proved more successful.

Rubber planters in Central America have been experimenting regarding cultural methods for a good many years, and it is only of late definite results have been forthcoming. In many special questions no ultimate conclusions have yet been arrived at, and we cannot say that we are absolutely certain as to the best methods in any particular stage of the cultivation or preparation of *Castilla* rubber.

By far the greatest acreage under *Castilla* is in the Republic of Mexico. Since Romero in 1872 commenced planting rubber in that country the industry has been gradually increasing until at present (July, 1908) there are at least over 110,000 acres planted. Many plantations are very large in area. Thus the writer knows of fifteen plantations, with over 2,500 acres each, planted in *Castilla*. One of the largest plantations expects to have in a few years 12,000 acres under rubber in one continuous area. Nearly half of this is now planted. Another estate has close upon 5,000 acres planted.

The main rubber districts of Mexico are Soconusco, in the far south of the State of Chiapas, with some 14,000 acres planted, and the Usumacinta River district on the Atlantic side, with rubber planted in many places from Palenque to the coast, where there are quantities of rubber found in the vicinity of Frontera, in the State of Tabasco.

The Grijalva River district is in area the largest, and contains a number of plantations, some of them thirty years old. A smaller district along the Uspanapa River adjoins the former, and the Isthmus district comprises a number of rubber estates, some good, others known as failures. Trinidad River district, close to the latter, is well known for its several rubber estates. Some distance to the west is the Playa Vicente district on the Tesechoacan River, and north of this, on the Papaloapan River, is the Tuxtepec district, only recently opened for rubber culture. Tuxtla, Tierra Blanca, Tezonapa, and Tuxpan are minor districts, all of which are in the State of Vera Cruz. In the State of Oaxaca there are several plantations near Pochutla, on the Pacific coast, and as far north as near the Rio Grande de Santiago in Tepic, rubber is being planted.

(To be continued.)

The Cultivation of Sisal (Agave Rigida).

PART IV.

HAVING received several enquiries as to the different fibres spoken of by the various authorities quoted by us throughout these articles, we believe that the following will interest our readers :—

The true Sisal of Yucatan and the Bahamas = *Agave rigida var elongata* and *sisalana*.

The large blue aloe of North-west India = *A. lurida*. The *A. vivipara* is narrower than above.

Maguay = *A. cantula*.

Mauritius Hemp = *Furcraea*, or *Fourcroga gigantea*, or *F. fœtida*.

Manila Hemp = *Musa textilis*.

Tula Istle or Ixtle Fibre = *A. lechuguilla* of Texas.

Jaumave Istle = *A. lophantha*.

New Zealand Hemp = *Phormium tenax*.

Palma Istle is obtained from *Samuella carnerosana*, and also from the *Yucca treculeana*.

Other kinds include :—

The true Hemp = *Cannabis sativa*.

Jute = *Corchorus capsularis* and *C. olitorius*.

Ramie = *Boehmeria nivea var tenacissima*.

Sunn Hemp = *Crotalaria juncea*.

Our last article on Sisal planting appeared in the July issue. Since then accumulation of back work, owing to the Rubber Exhibition, prevented our continuing with the matter again until now.

Before leaving that most important question of the distance at which to plant, we would point out, in common with others, how necessary it is with such a heavy crop as Agave leaves, which may go, according to reliable authorities, to over 50 tons to the acre per annum (1,000 plants per acre, and forty leaves each 3 lb. to each plant)[2] to arrange if possible for a tramway along the ground, or a cable-way overhead to remove the leaves, and take them as quickly as possible down to the mill. Major Boyd tells you that an efficient tramway system (like Decauville or Koppel)[3] may be said to be an absolute necessity, to be laid permanently along the main ways, and with movable sections as feeders. Cars and motive power, Mr. Conter warns you, must be secured. Light and easy running cars with a capacity of 2,000 leaves (weighing at least 2,500 to 3,000 lb.) to be operated by a 10-h.p. engine, for roads with grades not exceeding 5 per cent. In arranging for transport, the lay of the land must be made to help in every way possible, and the mill so placed that every advantage be taken of slopes for sending the laden cars down, so that they can return up-hill empty, and not when full. The water supply would, however, also play a leading part in choosing the site of the factory.

Having decided at what distance to plant the suckers, we will go on to the next stage. "One man," says Major Boyd,[4] "can dig out 200 holes, drop suckers, and plant them in a day. A young man has done 250 plants, and charged 3s. 6d. for the job, but the holes were only 18 in. in diameter, and 8 in. deep." On the other hand, he pared the plants equal to a quarter day's work or rather less, for a man can easily pare 1,000 to 1,200 plants a day. Mr. Stoddart, in his work, says (speaking probably of Jamaica) "that it is worth 4s. 6d. per acre of 605 plants, or 9d. per 100 to line out, dig holes, drop suckers and plant, and that a man and a boy can plant at least 300 suckers, or half an acre, a day." In Queensland Major Boyd reckons that it would cost 7s. to 8s., if not more, to plant an acre.

Planting should be done when showers are expected, as they materially hasten the rooting of the plants and settling of the soil. In clearing the land for planting, the trees and bush need only be cut level with the ground, and then burnt off in heaps. Like the maguay (*A. cantula*) the sisal feeds heavily upon potash, so the ash left in the heaps will furnish valuable fertilizing material. After planting constant cultivation and manuring is a disadvantage. Sisal thrives best without any hoeing or ploughing. It is *very* important not to plant too deep.[5] In no case should the point of origin of the leaves be covered, for if it is, the new leaves will rot off as they are produced. It is on this account important to see that no soil gets into the inside of the leaves. Sisal plants should be put in the ground in a perfectly upright position, and all exactly the same distance apart. At the same time, according to Major Boyd, in very rocky land it will often not be possible to plant in continuous rows, or even in straight lines ; very solid rocky spots will have to be left unplanted.

This authority (Boyd) does not make a point of using a nursery, he simply remarks, that should the land not be ready for the plants, a nursery must be prepared, and the young suckers planted 18 in. apart. Frank E. Conter, however, speaking of Hawaii, evidently attaches importance to nurseries, though possibly for the same reason, *i.e.*, to receive the bulbs or bulbils and suckers, and set them out at the earliest opportunity. In Mr. Watkins' report on Caicos sisal cultivation, he states that the vitality of the plant is such that suckers, even after remaining for the lapse of months out of the soil, will grow. It is best, however, to get them in as soon as possible. The life of the sisal plant in the Caicos Islands is, if we remember rightly, estimated at about eight years, at the end of which time replanting must be resorted to.

(*To be continued.*)

[1] Part I., December, 1907; Part II., February, 1908; Part III., July, 1908.

[2] Major Boyd, p. 17.

[3] We are also discussing with a prominent firm the possibility of utilizing overhead wire-ways on some estates, and may publish an illustrated article on the matter.

[4] "The Sisal Fibre Industry," p. 11, by Major Boyd.

[5] Dr. Mann, "Sisal Hemp Culture," p. 13.

LONDON EXCHANGES.

THE (London) Bank Rate and Foreign Exchanges on London, *ex* the *Times* of January 22nd :—

On January 14th the Bank Rate was raised to 3 per cent., after remaining at 2½ per cent. since May 28th. At this time last year it stood at 5 per cent.

Bombay, Tel. Trans.		...	...	...	1/3 15/16
Calcutta	,,	...	...	...	1/3 31/32
Hong Kong	,,	...	...	...	1/9 3/8
Shanghai	,,	...	...	...	2/4 1/2
Singapore	,,	...	...	...	2/3 13/16
Yokohama	,,	...	...	...	2/0 7/16
Alexandria	,,	...	...	...	Pi 97 5/8
Rio, ninety days		...	...	...	15 7/32
Valparaiso	,,	...	...	...	12 5/16
Buenos Aires	,,	...	...	...	48 3/8
Monte Video	,,	...	...	...	51 1/16

"Tropical Life" Friend.—No. 43.

HON. JOHN BARRATT.

Director of the International Bureau of American Republics.

EVERYONE interested in Latin America knows, of course, the *Bulletin of the International Bureau of American Republics*. With the July issue, a new plan of publishing was inaugurated, whereby two Bulletins are now issued, instead of only one as formerly. There is now an all-English edition, as well as one in Spanish, Portuguese, and French. To those who can only read English, the change is most welcome. Not only is a more handy publication the result, though the book, being some 200 pages, is still a substantial one—but it is now published monthly, and liberally illustrated with most excellent portraits and views of the country, and the handling and transport of the various products.

Each month the Bulletin hopes to publish important information in regard to the trade and commerce, progress, laws, &c., of the various Republics. The information obtainable on these most important planting and trade centres, will therefore be greatly increased. Hitherto one could only pick up news of these parts of the world in a most casual and unsatisfactory manner, with the not unnatural result that many, perhaps most, people know less of the life, geography, and possibilities of Latin America than they do of Africa, although the former has become as civilized and refined in all ways as cities of corresponding importance in Europe or North America.

"Our Friend" this month has been in charge of the Bureau since its first inception, and has done excellent work whilst here, work of a character as diverse as it is important. Many of the Latin American States still need reforming in many ways. Some of their faults are inherent in the various races, and seem unlikely to be eradicated; but there is no doubt that immense strides have taken place during the last few years in the right direction, inspired and encouraged by the Pan-American Congresses that are held every five years, and by the publicity given to the fiscal and commercial status of the various countries. Much of this improvement is due to the successful work of the Bureau, and that the work of the Bureau has proved so successful is very largely due to its popular and hard-working Director, Mr. John Barratt. The only two American Republics that have no representatives on the Governing Board of the Bureau are Paraguay and Venezuela

In the *World's Work* (Doubleday, Page and Co., New York) for August, Mr. Barrett discusses "Big Facts about Latin America," showing the values of the leading articles exchanged between the United States and the countries to the south, and the possibilities for still further increasing reciprocal commercial relations. The balance of trade is shown to be largely in favour of Latin America, as value for value, the leading products shipped to the United States far exceed the articles sent in return. Thus sugar, whose receipts from Latin America are valued at over $69,000,000, is not equalled by iron and steel manufactures sent thither for $57,000,000, nor is coffee, worth $68,000,000, offset by wood manufacturers for $25,000,000, the same discrepancy being noted in the values of the remaining fifteen leading items of import and export.

Mule's Milk.

IN his Annual Report for the year ending March 31st, 1908, Professor Carmody, F.I.C., F.G.S., Analyst to the Government of Port of Spain, Trinidad, W.I., includes the following analyses of two samples of a mule's milk which had been analyzed :—

	Solids. Not fat.	Fat.	Cream.	Ash.
Specific gravity at 29° C., 1020 ..	6·54 %	4·5 %	5 %	·72 %
,, ,, 30° C., 1025 ..	7·24 %	1·0 %	2 %	·40 %

The mule had met with an accident, and a flow of milk suddenly developed.

DISEASED material and pests analyzed in connection with a banana disease, writes Professor Carmody in his Annual Report, were examined microscopically and chemically. The chemical nature of the soils in which the diseased bananas occur differs in several important features from the non-diseased areas, as the following figures show :—

SOIL (BANANA CULTIVATION)—ST. AUGUSTINE ESTATE.

	Not diseased.	Diseased.	Badly diseased.
Water	2·640	2·520	2·560
*Loss on ignition	7·620	7·380	6·980
Insoluble silica and silicates ..	79·483	80·778	79·487
Soluble silica	·240	·240	·320
Oxides of iron and alumina ..	9·216	8·413	9·976
Lime	·168	·073	·129
Magnesia	·070	·080	·090
Potash	·167	·198	·181
Soda	·034	·103	·085
Phosphoric anhydride	·294	·147	·134
Sulphuric ,, ...	·068	·068	·058
	100·000	100·000	100·000
*Containing—Total Nitrogen ..	·211 %	·211 %	·161 %
AVAILABLE PLANT FOOD.			
Potash	·0179 %	·0073 %	·0065 %
Phosphoric anhydride	·0416 %	·0071 %	·0058 %
Nitrogen as nitrates	·0006 %	·0002 %	·0002 %

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Tropical Life.

JANUARY, 1909.

The Importance of Nitrogen as a Plant Food.

UP to comparatively recent times many cultivators of the soil, whether planters, farmers, market gardeners, or fruit growers, held the opinion that scientific men could not teach them anything of value. On the other hand, the "man of books" had not fully realized the limitations under which he himself laboured, nor that he had much to learn from the practical man.

Within the last few years, however, the scientific and the practical man have gradually come into closer touch with one another, and the attitudes of both have undergone a change.

It is now recognized by all who have given any serious thought to the subject that all the world over, under the changed and keenly competitive conditions of the present day, education, scientific and technical, is essential to the success of any movement having for its object the improvement of the industry of the cultivation of the soil. However valuable the knowledge gained by practice may be, that knowledge must now be supplemented by scientific study.

By this we do not wish it to be thought that the practical man must become a scientific expert, but to urge upon him the benefits he may reap by taking advantage of those invaluable discoveries of scientific men which have been proved by practical experiment and demonstration throughout the world to be beneficial to his crop and estate.

It has occurred to us that there is much yet to be learnt in one very important branch of this subject, viz., the proper use of artificial manures on tropical and subtropical crops, such as, for instance, tea, coffee, cacao, bananas, maize, sugar, tobacco, cotton, and fruits of all kinds, and we therefore propose during the year 1909 to continue our series of articles giving some information on the subject of the three main elements of plant food: nitrogen, phosphates and potash.

Each of these essential foods *must* be present in the soil, if the best results are to be obtained, and whereas either one or other of them is sometimes present in abundance, there may be a total absence of the others, which must be supplied in some form or another.

Of these three essential foods, the one which is most often lacking is nitrogen. It is also the most expensive to supply, but its effect well repays the initial outlay.

The two best known purely nitrogenous manures are nitrate of soda and sulphate of ammonia. The latter is manufactured mainly from the ammoniacal products of gasworks, and is produced by the union of sulphuric acid with ammonia, which takes place immediately the two substances are brought into contact; but as, in that case, the nitrogen exists in the form of ammonia salts, it requires to be nitrified before it is available for growing plants. This process of nitrification takes place in the soil. Nitrate of soda, on the other hand, is the most rapidly acting of all fertilizers, and it is this characteristic which gives it such additional value, for it is certain that a small quantity of a quick-acting manure is more profitable than a large quantity of a slow-acting one, especially on soils which have become partially exhausted of the plant food elements.

We have sometimes heard it stated that an application of a nitrogenous fertilizer, such as nitrate of soda, has produced no good results. But in most of these cases where the use of nitrogen has apparently produced no effect, it is due either to its having been carelessly applied, or to the absence of a sufficient quantity of one or other —perhaps both—of the other essentials, phosphates and potash. But as nitrate is so quick in its action, it is used generally during the early spring growth of plants and trees, and therefore almost always alone as a top-dressing, the slow-acting fertilizers, such as phosphates and potash, having been applied after the removal of the previous crop.

It must be clearly understood that nitrogen is only *one* of the necessary plant foods, and though it may be, and often is, beneficial by itself, yet it cannot supply the want of either phosphates or potash or other plant foods which may be absent.

It must also be remembered that a sufficient quantity of nitrogen is an imperative necessity, and that most soils are deficient in it, certainly those which have been under cultivation for many years with the same crop. Great care must be exercised both as to the amount and method of application of nitrate of soda, and other soluble fertilizers. It is therefore necessary, while avoiding scientific discussions, as far as possible, as to their proper use, that those who apply them to their land should have a very clear conception of the underlying principles, in order that they may intelligently increase their production, and thus reap a profit. Having recently been much impressed with the wonderful results obtained by the use of nitrate of soda on maize crops, we took the opportunity of getting some information as to the proper use of that fertilizer, for, as we have said, a certain amount of intelligence must be exercised in its employment. It is necessary to emphasize this, because some very erroneous ideas are frequently entertained about the effects of artificial manures, which owe their origin not to any fault in the manure itself, but entirely to the fact that they have often been used in a very improper and unskilful manner. Even farmyard manure itself suffers more or less from the same causes, with the inevitable result that a less effect is produced on crops than if it were employed with greater skill and a more exact knowledge of the manner in which it acts on the crops to which it is applied.

In the case of the more concentrated and costly artificial fertilizers the return is in a far higher degree dependent

not on the intrinsic merits of the fertilizers themselves, but on the method of using them.

Of all these manures none requires to be employed with greater skill than nitrate of soda. None gives more disappointing results if improperly used, and none will give such a quick and ample return if it be employed in a proper manner.

There is no doubt that in many cases of insect pests the use of nitrate of soda will be a most effective means of extirpation, as it forces the plant into such a strong and vigorous development that the attacks of the pests do not appear to have any serious lasting effects on the trees already attacked, and in cases where contagion is possible or probable, increasing the vigour of the tree is the best method of warding the trouble off. It is especially so with cacao,[1] in the case of "die-back," when the nitrate will cause the tree to "flush," so to speak, like a tea-plant, and to thus successfully combat the disease even when hovering over its very branch-tips. The rapidity with which nitrate acts, and the strong stimulus it so promptly gives to the growth of the plants, adapts it for this purpose in a very special degree, and no other manure in common use is capable of being substituted for it.

There are no doubt hundreds of plantations of various descriptions in the Tropics where the crops are beginning to show a falling off year after year, even if only in a small degree. In most cases, and certainly so with cacao in the West Indian Island of Trinidad, this state of affairs is undoubtedly due to the fact that one or other of the essential plant foods is lacking on the soil. Surely the planter or farmer will come to the conclusion that it is worth while to gain at least some elementary knowledge of the necessary plant foods, and of the means whereby a deficiency of any or all of them can be supplied at a comparatively small expenditure of time and money, for which he will be more than repaid in the increased yield and value of his crops.

The Italian Disaster and the Sicilian Citrus Fruit Trade.

AN article on fruit growing in the London *Daily Telegraph* is always worthy of attention, but those on Italian products are especially so. The writer of these notes is well known to those who attend the Colonial Fruit Shows at the Royal Horticultural Hall, and being of Italian, if not Sicilian, extraction, knows well what he is writing about. At the June show we took lunch together, and had a pleasant time discussing fruit culture and music—for every Italian can talk of musicians and the opera.

The other day, just after the Sicilian catastrophe, our contemporary published[2] some notes on the Sicilian lemon and orange industry, which, in face of the growing importance of our Colonial fruit trade, should not escape notice. The lemon is, of course, by far the most important agricultural product of Sicily, and for flavour and quality is considered to be among the best, if not the best, that reach us on this side—that is, for lemons. Many people who have tried limes—especially those sent over from Dominica—prefer the West Indian fruit for flavour and juiciness; it is also more refreshing. In saying this, we do not wish in any way to disparage our old friend the Sicilian lemon—we only wish to give the Dominica and West Indian fruit its proper due. Murcia, in Spain, we are told, has of late years cultivated lemons of an attractive, wax-like exterior, but of a less refreshing quality than those produced in Sicily.

Those in the Tropics who have bitter orange trees on their lands will be interested to know that the Sicilian lemon fruit has been mostly grafted on to bitter orange trees. This was done because on the old original lemon trees gum was formed to such an extent as to interfere with the output, and growers were compelled to find means whereby their crops could be increased. The result of this has been that the original lemon tree is now rarely met with, and that the present fruit really contains a strain, although quite imperceptible, of the bitter orange.

It yet remains to be seen to what extent the terrible disaster that has overtaken Messina and Reggio will affect the Italian citrus fruit trade. Of course, the fruit is not to any extent produced in Messina itself, but in the country around, but since so many thousands of people have been killed, it may reduce the labour supply and financial support, and so affect the industry in that way. During the 1903-4 crop Sicily exported over 3,500,000,000,000 citrus fruits, and on December 31st, 1906, it was estimated that out of a total population of 3½ millions, 750,000, or nearly one-fifth of the total population, were engaged in agricultural pursuits, almost entirely connected with the production of citrus fruits.

According to the correspondent of the *Daily Telegraph*, the choicest fruit is produced upon the mountain slopes, where the atmosphere is more beneficial than that of the land below. Most of the fruit, it seems, grown at the base of the mountains is much inferior to that from higher up, both with oranges and lemons.

Shippers of citrus fruit will do well to get their shipments across the Atlantic as quickly as possible. Although Italy is much nearer England than the West Indies, that does not mean that the West India limes cannot find their way into the English household quite as speedily, if not more so, than their Italian competitors. Those anxious to develop the Italian trade maintain that the Messina or Palermo fruit is, as a rule, several weeks old by the time it is consumed, and by that time, besides a less matured fruit having to be picked, the juice becomes less exhilarating and refreshing, as well as less beneficial than when freshly gathered. In the case of the Sicilian fruit, the delay is partly caused by the middlemen and others, through whose hands the fruit passes. Should West Indian and other Colonial centres anxious to encourage their citrus fruit trade wish to avoid the same trouble, they must organize among themselves associations and societies, as have already been called into existence in some cases, and through their help avoid loss of profit, and loss of time, in getting their fruit to market.

The blood oranges shipped from Sicily are very popular, being sweet and juicy. Connoisseurs, however, claims the *Daily Telegraph*, look askance at the blood orange as possessing something foreign in the flavour, due no doubt to its being produced by grafting with the pomegranate, which grows to perfection in Sicily. That island, by the way, also produces large quantities of prickly pears for its home consumption.

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[1] We learn from Stockdale that this disease does not readily attack trees in a vigorous condition of health, and again, Hart tells us that the principal destruction to the trees and pods appears to occur on poorly cultivated or inferior soils.

[2] "D. T.," Issue of January 2nd, p. 14.

Annual Review of India Rubber Market, 1908.

By Messrs. S. Figgis and Co.

The acreage under rubber plantation in Ceylon and British Malaya (Federated States, Perak, Malacca, Johore, Straits), Sumatra, Java, India, &c. (partly mixed with other products) is now nearly 500,000 acres. Ceylon (and India) exported 350 tons against 230 tons in 1907, 160 tons in 1906, and 70 tons in 1905; Malaya, &c. exported 1,450 tons against 780 tons in 1907, 350 tons in 1906, and 75 tons in 1905.

During the year there has been a further general improvement in preparation, less of inferior and "tacky," much more of fine clean crêpe—some of very good colour realizing high prices—and nice resilient sheet. The enormous variations and great advance in prices since early October (fully detailed below) have resulted in very high "average price" for plantation during recent months; but, as we formerly predicted, the difference in value compared with fine Pará Brazil rubber lessens with the larger supply of plantation. Manufacturers have shown a decided preference for sheet, biscuit, and crêpe; the latter should not be drawn out too thin, or have visible air or steam bubbles in it. Some lots of strong thick crêpe sold very well. We think it has been profitable to planters to wash and clean the rubber thoroughly, and to prepare as large a proportion as possible of good colour—also not to send many qualities or very small lots. Block has not been in favour generally,[1] and, unless clean, resilient, hard quality can be sent, it may be better to ship as crêpe or sheet.

Smoked rubber appears to have greater resiliency, and to be more suitable for many purposes than unsmoked. "Smoking" prevents the "proteins" in rubber from decomposition, and generally from "tackiness." All fine rubber from Pará is smoked.

During last January and February we had declining markets (from the values of January 1st, viz., fine Pará 3s. 5d., fine plantation 3s. 11d.), owing to the withdrawal from purchasing rubber by America, and the continued closing there of many factories. The lowest price was February 21st, when fine hard Pará was sold at 2s. 9d., good sheet plantation (Malay) at 3s. 1¼d. America showing signs of revival, values rapidly recovered, and advanced 1s. per lb. by middle of May. Prices were irregular till October 6th, when plantation sheet sold at 4s. 6½d., Pará 4s. 4½d. With a strong American demand and corner of "bears," by November 10th the price was a further 1s. per lb. higher, and on November 17th the highest price of the year obtained, viz., 5s. 5d. for fine hard Pará, whilst sheet plantation realized 5s. 9d. to 5s. 10d. Values fell subsequently, and to-day fine plantation is 5s. 3½d., fine hard Pará 5s. 1d. to 5s. 2d., fine soft 4s. 9½d. The rapid fluctuations and extraordinary rise in values appear hardly due to natural or normal causes, but the world's demand has been more than equal to the reduced supply, and at some periods our stocks have been remarkably small, especially of fine Pará. Total stocks now are smaller than for many years. Notwithstanding the serious losses in Brazil, the supply from the Amazonas has increased, but there has been a large reduction of Maniçoba, Mangabeira, and Pernambuco. Brazil exported 40,000 tons. Our doubts as to synthetic rubber have proved to be correct. It is not mentioned now, and common substitutes have been neglected, though cheap. A large trade is being done in reclaimed rubber, and quality improved. Rambong has sold fairly well, especially small lots of nice hard clean. Castilloa in small supply, but not liked even at low prices.

The world's supply in 1908 was about 65,000 tons, against 69,000 tons in 1907, and 65,000 tons in 1906. Consumption, we estimate, was about 67,500 tons.

Of rubber planted, we estimate in the East nearly 500,000 acres. Ceylon, 180,000 in 1908 against 150,000 in 1907; Malaya, Malacca, &c. (containing about 20,000,000 trees, not 2,000,000 tapped in 1908), 185,000 in 1908 against 100,000 in 1907; Borneo and New Guinea, 10,000 in 1908 against 9,000 in 1907; Java (60,000) and Sumatra (30,000), 90,000 in 1908 against 70,000 in 1907; India and Burmah, 30,000 acres in 1908.

Mexico, Nicaragua, and Honduras have plantations, but are not increasing—probably by now 20,000 acres planted; also Colombia, Ecuador, Bolivia, and Peru.

India is extending—probably about 30,000 acres planted. Some in Burmah and Mergui; the Philippines (small as yet), Samoa, Hawaii, and beginning in New Guinea and other islands, Queensland and Seychelles. The West Coast of Africa has plantations, and more progress has been made in the Congo region and German West Africa, also in British East Africa, Uganda, and the West Indies, probably 2,000 acres.

Brazil exported in 1908 about 40,000 tons against 41,500 tons in 1907; Maniçoba seriously decreased, also Guayule from Mexico, largely used in America and on the Continent. Prices of Guayule are very much lower though the quality has improved; probably 2,000 tons were made.

1908 will be remembered as a year of record variations in values and enormously increased price at the close compared with the beginning of the year; also the constant large demand for fine Pará, which all countries have wanted in larger proportion than formerly. As a result, the advance to-day, compared to this date last year, is 1s. 8d. per lb. on fine Pará, but only 6d. to 1s. on Negrohead and 10d. on Caucho ball. For the reasons stated in our last annual, prices declined last January and February; several American factories continued closed, consequently too much rubber was left on the English market. On February 21st we had the lowest prices of the year, hard fine Pará being sold at 2s. 9d., scrappy 2s. A recovery soon ensued, and, as detailed below, prices advanced 1s. per lb. With eager American buying and cornering of large bear operators, we had a further great advance in November, prices then being about double those of February 21st. Mediums were only saleable at very low prices till November, and the disastrous results to importers and holders seriously restricted imports, resulting in stocks being abnormally small now.

English consumption of rubber has been very large, that of France and Germany good, Russia only moderate, and America much less till quite recently. We think invisible stocks must be large in America, owing to her very free buying during the last three months. The European stocks are exceedingly small.

The world's supply of about 65,000 tons has been all consumed. In 1907 we had 69,000 tons, 1906, 65,000 tons, and we begin this year with very small stocks of all rubber (especially mediums).

"Slab" rubber was scarce and sold well; "ball"

[1] Pale block, 1 to 1½ in. thick, or even more, if well washed and clear, has, however, many advantages. Not needing to be passed through the washing machine, it can be stored in manufacturers' warehouses with much less waste by oxidation and general deterioration than sheet or biscuit.

plentiful (and of good quality), and very ready sale. "Tails" only saleable at low prices. The supply of mediums was much smaller.

This year's Pará crop was very good quality. All fine should be cut and carefully selected before shipment. Caucho ball increased and of useful quality. Bolivia increased. Mollendo sent less. Venezuela, *via* Orinoco, more. Ceará and Maniçoba great reduction. Pernambuco and Assare small supply, but sold cheaply. Mattogrosso crop was fair, but quality not so good. Mangabeira, from Santos and Bahia, less supply and cheap.

The supply of Central America greatly declined. Mexico was in moderate supply. Colombia small lots, and part poor, undesirable quality. Ecuador was fair quality, also Nicaragua. We had a few lots of plantation from these countries, and estimate 20,000 acres planted there.

Qualities of West Coast of Africa have somewhat improved, but prices were low for Niger, Gold Coast, Accra, and Lagos. Good qualities from the Cameroons, Sierra Leone, Gaboon, and Conakry sold at high prices. The French Congo and Soudan, mostly from Senegal *via* Bordeaux, sold fairly.

Of East Coast Africa kinds, Zanzibar, &c., rather less was received. Prices show an advance for the year of nearly 1s. 3d. per lb.; quality has been fair. Nyasaland very little to hand. Mombasa and Lamu fair. Uganda small. Abyssinian supply is increasing, quality middling.

Great reduction of Madagascar supply; prices close showing a rise of 1s. per lb. Some lots of nice clean Niggers sold well. Supplies of Rangoon were small, and those from Assam have much decreased. Penang greatly reduced; prices much higher recently. Supply of Java was small, but planting is going on freely, and we may expect increased supplies. Borneo very little to hand, and sold cheap. Tonkin and French Cochin China did not increase, but sold well. New Guinea sent us none. Pontianak has been abundant and fairly high.

The prices of Pará in January, 1908, were 3s. 5d. per lb. for fine hard Pará, 3s. 2d. soft fine; Negrohead, scrappy 2s. 10d., Cameta 2s. 0½d., Island 2s., Caucho ball 2s. 9d. With no American demand and full supplies, we declined on February 21st to the lowest of 1908—2s. 9d. hard fine, 2s. Negrohead, scrappy, and Caucho ball; prices advanced 4d. per lb. in a fortnight, and late in May fine hard was sold up to 3s. 11d., scrappy at 2s. 7½d.; then at 2d. less; but in early July at 4s. and 2s. 9d. In the latter half of July and August we fell to 3s. 9d., and ball 2s. 6d. American large steady buying set in during September and October, resulting in large business up to 4s. 6d. and 3s. 1d., whilst in November, with "corner of bears" and large American demand, we sold at the highest price of the year—fine hard up to 5s. 5d., scrappy at 4s. 1½d. With less forced buying prices declined 5d., and we closed the year with fine hard 5s. 1d. to 5s. 2d., fine soft 4s. 10½d., Negrohead, scrappy, 3s. 10d., Cameta 2s. 7d., Island 2s. 5d., Caucho ball 3s. 7½d.

Balata was in fair supply, and fairly steady; sheet 2s. 6d. down to 2s. 3d., block 1s. 6½d. up to 1s. 9½d., closing at 2s. 3½d. and 1s. 8½d. to 1s. 9d.

Total Pará shipments in tons, Jan.—Dec., 1908:—

	Receipts at Pará. Pará.	Peruvian.	Shipments to Europe.	Shipments to America.
1908	30,700	7,460	.. 20,630	.. 17,530
1907	30,360	7,160	.. 20,940	.. 16,460
1906	28,270	6,250	.. 18,440	.. 16,270
1905	28,320	6,109	.. 18,520	.. 15,260
1904	25,995	4,390	.. 14,285	.. 16,280

Coffee.

By Messrs. C. M. AND C. WOODHOUSE.

THE public market reopened on January 5th, when about 9,000 bags of Costa Rica, Central American, Colombian and Santos were offered. There was a good general demand, and fully steady to rather dearer prices were realized. It is reported that a landslide in Costa Rica has broken the railway communications, and that future shipments of coffee from that country are likely to be delayed for two or three months. Yesterday the first shipment of new crop East India, consisting of Neilgherry descriptions, were submitted; fine qualities met with good competition from the Home Trade, and extreme prices were realized. At the close the demand was rather slow, but values are again rather dearer. The stocks in the principal ports of Europe on January 1st, according to Messrs. Düüring and Zoon's report, show a decrease for the month of 140,000 bags, against an increase of 355,000 bags for the same time last year; the visible supplies are 528,000 bags less for the month, against 108,000 bags less for the same period a year ago, the total on January 1st being 15,819,000 bags against 16,727,000 bags on January 1st, 1908. The market for futures has been steadily rising since our last issue, and prices at the close show an advance of about 1s. 9d. This is partly due to smaller receipts, and to an improved statistical position as shown by the figures for the world's visible supply, and the European stocks, and also to the fact that the stocks held by the San Paulo Government are not likely to be realized before 1910. The latest price of March Santos is 28s. 1½d., about 4s. per cwt. higher than the recent lowest point touched. We quote:—

		1908. To-day.	Dec. 23rd.
London ..	Santos, Mar. dely.	28s. 1½d.	26s. 4½d.
New York ..	No. 7 Rio ,,	5·80 cents	5·30 cents.
Hamburg ..	Santos ,,	31¾ pf.	29 pf.
Havre ..	Santos ,,	40¾ francs	38½ francs.

The receipts at Rio and Santos from July 1st, 1908, to January 5th, 1909, were 9,466,000 bags, against 7,479,000 bags and 12,459,000 bags in the two previous seasons respectively.

Sales include the following, viz.:—

East India.—340 bags Neilgherry, &c., New Crop, 50s. to 56s. 6d. for smalls, 55s. to 64s. 6d. for middling to good middling, 77s. 6d. for fine middling, 62s. 6d. to 70s. 6d. for good middling to good bold, 88s. 6d. to 89s. for fine bold.

Nyasaland.—180 bags, mostly pickings, &c., but including 44s. to 48s. for fine fine ordinary to middling, 49s. to 53s. for bold.

Jamaica.—91 barrels and bags, at 42s. to 43s. 6d. for good to fine ordinary, 48s. to 53s. for fine fine ordinary to low middling.

Costa Rica.—1,400 bags, at 40s. to 53s. 6d. for ordinary to fair smalls, 48s. 6d. to 54s. 6d. for fine ordinary to low middling, 57s. to 65s. for middling to good middling, 70s. 6d. for fine middling, 59s. to 72s. for middling to good middling bold, 47s. to 85s. for good to fine bold.

Guatemala.—350 bags at 41s. to 46s. for smalls, 51s. 6d. to 56s. 6d. for middling to good middling, 63s. to 71s. for good middling to fine bold.

Ecuador.—41 bags at 50s. 6d. for middling, 62s. 6d. for good middling bold.

Bahia.—10 bags, at 27s. for common mixed palish.

Dumont Santos.—3,500 bags unwashed at 37s. 6d. for smalls, 39s. to 40s. 6d. for medium, 40s. 6d. to 44s. for bold.

Cotton.

THE following were the prices for Cotton in London on January 7th, according to Messrs. Slann and Davies:—

	Good Fair.	Good.	Fine.	Superfine.	Good 1907.	Good 1903.	Compare
	d. d.	d. d.	d. d.	d.	d. d.	d. d.	
Surat kinds* ...	4 to $4\frac{11}{32}$	$4\frac{1}{4}$ to $4\frac{5}{8}$	$4\frac{1}{2}$ to $4\frac{3}{4}$	—	$4\frac{5}{8}$ to $5\frac{3}{8}$	$4\frac{5}{8}$ to $5\frac{3}{8}$	per lb.
Madras	$3\frac{9}{16}$ to $4\frac{1}{2}$	$3\frac{3}{4}$ to $4\frac{3}{4}$	—	—	$4\frac{1}{2}$ to $5\frac{3}{8}$	$4\frac{15}{16}$ to $5\frac{9}{16}$	—
Bengal	$3\frac{3}{8}$	$3\frac{5}{8}$	$3\frac{7}{8}$	4	$4\frac{3}{8}$	$4\frac{1}{2}$	—
Assam ...	—	$4\frac{3}{8}$	$6\frac{1}{4}$	$6\frac{3}{4}$	$5\frac{1}{4}$	$5\frac{1}{4}$	—
China	—	$4\frac{3}{8}$	$5\frac{1}{8}$	$5\frac{1}{2}$	$4\frac{7}{8}$	$4\frac{15}{16}$	—
West Indian ...	$4\frac{3}{4}$	$5\frac{1}{4}$	$5\frac{3}{4}$	6	8	$6\frac{1}{4}$	—
Sea Island ...	6	$8\frac{1}{2}$	$12\frac{1}{4}$	$14\frac{1}{2}$	12	$9\frac{1}{2}$	—
Australian	$5\frac{1}{2}$	$5\frac{7}{8}$	—	—	$7\frac{1}{2}$	$6\frac{3}{4}$	—

* Liverpool quotations.

Business was again interrupted by the holidays, but during the few days under review there has been a good spot demand for American, and a fairly active trade in "Futures," resulting in an advance of 6 points for spot middling, 4 to 5 points for near, and $2\frac{1}{2}$ to 3 for the distant positions of "Futures." East India has been affected by the improvement in American, and is partially $\frac{1}{16}$d. to $\frac{1}{8}$d. per lb. higher.

The import into Liverpool this week amounts to 199,501 bales, since January 1st 199,501; same week last year, 147,858; last year's total, 147,858 bales. The estimated Sales amount to 72,000 bales. Middling American is quoted at 5·04d. per lb.; last year, 6·12d.; 1907, 6·02d.

Movement of American Cotton since September 1st:—

	1908-9.	1907-8.	1906-7.
Brought into sight	8,339,000	6,426,000	7,865,000
Exports from United States since September 1st—			
To Great Britain	1,818,000	1,520,000	1,750,000
To Continent, &c.	2,543,000	2,050,000	2,225,000
Total crop	—	11,571,966	13,510,982

Sugar.

MR. C. CZARNIKOW, writing on January 7th, reported that the sugar market had been fairly steady, considering the flat reports from the United States. America continues to offer small lots of refined, filling all orders at 13s. 3d. to 13s. $4\frac{1}{2}$d. c.i.f., in 1 cwt. doubles, at which price there are only small special buyers, and our market has scarcely been affected thereby. Guma's estimate of cane available in Cuba, amounting to 1,397,500 tons sugar, which was higher than expected, created a temporary depression, but in comparing growing canes with production in previous years, it will be seen that the estimate of 1,250,000 to 1,300,000 tons sugar, with fair weather, may be reasonable, viz.:—

	1909.	1908.	1907.	1906.	1905.	1904.
Cane estimate ..	1,397,500	1,165,000	1,500,000	1,325,000	1,400,000	1,200,000
Sugar produced	?	962,000	1,428,000	1,175,000	1,163,000	1,034,000

Should the weather not be good, a smaller quantity may be expected, but even then it seems premature to speculate on weekly Cuban receipts, or on showery weather in the island, or on variations in New York prices; the latter improved from 3.67 to 3.70 cents, viz., from 9s. $1\frac{1}{2}$d. to 9s. 3d. c.i.f. for foreign 96 per cent., such sugars being worth in the United Kingdom at least 1s. more! The New York quotation just now is for preferential sugar only, and how it can affect outside cane is not quite clear, but each fluctuation in New York is now taken as an indication of Cuban prospects, not as correcting a high or low level. As to Cuban weather, which is showery and has stopped some factories, we have seen so much harm done by drought that it is too early yet to get frightened by reports of showers. The canes ripen later, though growing in size, but a late beginning may make it more difficult to finish in time. The weekly statistics, however, are not a safe guide now, because new factories have been built at outside ports, and are extending there.

The January—September meltings were probably under-estimated last year by 50,000 tons, and corrected in October—December; how they will turn out this year depends on the fruit crop, but it seems that the improved financial situation will favour consumption. Java may have less sugar to dispose of for Western destinations this year, and it is, perhaps, fortunate that America requires less, because the United Kingdom may want more cane. Of course, a good fruit crop and generally expanding consumption in the United States might easily absorb more sugar, especially with supplies more liberal than last year, which usually quickens distribution. Willett and Gray estimate the year's consumption at 3,186,000 tons, against 2,994,000 in 1907.

The increase in cane production this year is mostly in privileged Colonies shipping entirely to America, except Philippines, of which the Western shipments cannot be estimated yet. The other increases are partly in Brazil, Argentine, Demerara, and Domingo. At present prices Brazils will not go to America, and as the Permanent Commission of the Brussels Convention declares that country, as well as Mexico, as bounty-giving, their sugars are avoided by those United Kingdom refiners who re-export to Convention countries. We may have more Domingos here, whilst any excess of Demeraras should go to Canada. In Java the area under cane cultivation shows an increase of 2·8 per cent. over the previous season, and the last crop is now stated to be 1,190,600 against 1,156,500 tons, excluding stroops. The exports during December were 1,030 against 6,505 tons to the West, and 63,500 against 92,425 tons to the East. In Formosa the production is estimated at 850,000 piculs centrifugals and 800,000 piculs natives, against last year 384,000 piculs centrifugals and 758,000 piculs natives.

Business in cane sugar in the United Kingdom has naturally been interfered with by the holidays, but the

moderate sales made show no change in values, either for refining or grocery descriptions.

The accounts from cane-producing countries are, on the whole, of little interest, as the rains in Cuba, mentioned above, are in all probability only temporary; we must wait till February for more reliable figures of the yield. We also refer above to the increased area under sugar cultivation in Java. Owing to the improved weather in British Guiana, the recent grindings have given better results, with an increased yield over that anticipated some weeks ago. In Barbados, too, rains have done some good, though the crop is not likely to reach even last year's figure, while in Trinidad conditions have also somewhat improved.

The total transactions of British West India for the fortnight amount to about 8,000 bags, including crystallized Demerara, low to middling yellow and pale 15s. to 15s. 3d. duty paid, middling pale small grain 15s. 6d., good yellow 15s. 9d. to 16s., fine yellow and pale 16s. 6d. to 17s.; syrups (291 bags), good palish yellow 15s. to 15s. 3d., middling soft pale 14s. Trinidad syrups (400 bags), low foxy brown 11s. 6d.

400 tons Madras cane jaggery, March—April shipment, sold at 9s. 1½d., London landed terms, in bond.

2,000 bags crystallized Surinam sold, low middling yellow to good middling palish 14s. 9d. to 15s. 3d. duty paid, and 149 bags middling greyish syrups at 12s. 9d. to 13s. duty paid.

In Liverpool, 12,269 bags Peruvian syrups sold at 9s. to 9s. 9d., grainy at 11s. 6d. to 12s.; 270 tons syrups, basis 89, at 9s. floating, landing, Clyde.

Tea.

By Messrs. WM. JAS. AND HY. THOMPSON.

BOARD OF TRADE RETURNS[1] (IN LB.) FOR THE TWELVE MONTHS ENDING DECEMBER 31ST, 1906-7-8.

Importation.	1908.	1907.	1906.
Of Indian	172,477,200	171,680,400	183,850,600
,, Ceylon	108,654,700	107,387,200	106,324,900
,, China	21,467,300	18,776,900	13,176,400
,, Java and other Countries	20,288,600	19,282,500	17,838,200
	322,887,800	317,127,000	321,190,100
Home Consumption.			
Of Indian	157,441,700	162,496,000	159,234,800
,, Ceylon	92,960,400	87,078,000	91,953,600
,, China	8,920,700	9,729,400	5,672,000
,, Java and other Countries ..	16,092,300	14,692,500	13,277,600
	275,415,100	273,995,900	270,138,000

[1] Note the substantial increase in foreign teas both with Imports and Home Consumption.

The resumption of sales has been marked by little change in prices, although a certain amount of irregularity has been noticeable, due partly to the fact that many buyers, as is usually the case, are waiting to see the trend of the market before operating. In the meantime the position of tea remains the same; the trade have already handled some 6,000,000 lb. more tea than last year, and as the revised estimates of the extra output from India are now put at about 5,000,000, the fact that supplies from Ceylon are under those of 1907, should tend to secure a stable market. December London figures are chiefly interesting, as showing that while total imports are only 875,000 lb. in excess of the same month last year, deliveries total 3,223,000 more.

With Indian tea the opening sales comprised 46,527 packages, against 39,254 packages last year, the total brought forward for the season to date (including South Indian teas since August 1st) being 864,160 packages, compared with 795,871 packages during 1907-8—a difference of 68,000 packages. The auctions on January 4th opened steadily for all kinds, but towards the close a certain amount of irregularity must be quoted among the plainer liquoring grades, although no lower range of values was recorded. This irregularity was more marked on Wednesday when a fair amount of tea was withdrawn. Cachar and Sylhet growths suffered most, Brokens up to 8d. per lb. being rather neglected. Finest grades, as usual, sold well, all parcels with golden tip realizing full prices, while for good useful leaf Assams bidding was more active. Brokens of the same grade, however, between 10d. and 1s. dragged somewhat, and in one or two cases show a fractional decline. Among commonest descriptions there was practically nothing to be bought under 5¼d. Invoices from Darjeeling, showing a slight improvement in flavour, were much appreciated by the trade, who were eager to secure them at a higher range of values, which augurs well for final invoices with autumn flavour which are likely to be seen in a few weeks time. The best averages obtained were: Darjeeling—Chamong, 1s. 3d.; Jungpana, 1s. 0¾d.; Turzum, 11¾d.; Thurbo, 11½d. Assam—Kharjam, 11¾d.; Lengri, Kanjikoah and Keyhung, 11d. For the whole sale the result was 8⅛d. per lb., compared with 8½d. per lb. a year ago.

At the last sale of the year in Calcutta 25,000 packages were sold at an average price of 6 annas 6 pice. A generally firm tone prevailed. Common grades were rather dearer, Brokens showing an advance of 3 pice.

The accumulations of Ceylons over the Christmas holidays resulted in the large quantity of 37,698 packages being offered during the week ending January 9th, against 36,656 packages corresponding week last year.

In spite of the heavy offerings, the sale met with a good demand, more especially for teas up to 8d. per lb.; for grades above this figure there was some irregularity, and prices for the good medium broken Pekoes between 9d. and 10d. in several instances were scarcely maintained. Quality on the whole was satisfactory, a few fine invoices showing an improvement, and where this was noticeable good competition was forthcoming. The low grade descriptions met with a steady demand without any particular feature, except that export orders which have been scarce of late were more numerous.

Among the highest averages were the following: Sutton, 1s.; Cranley and Henfold, 11¼d.; Tillicoultry, 11d.; West Fassifern, 10¾d.; Kotiyagalla, 10½d., the result for the whole sale was 8⅛d. per lb., against 8½d. last year. Messrs. Forbes and Walker cable us that at the opening sale of the year in Colombo the market was strong for fine and common teas, while medium Pekoes were easier.

Some 1,191 packages of China Green Tea were offered and passed quietly at last quotations.

Since our last a fair trade has taken place privately in the lower grades of both black and red leaf descriptions, while Panyongs between 4½d. and 6d. have been dealt in by shippers at firm rates. Common black leaf from 3¾d. to 6d. have been enquired for, and some business has also taken place in the better grades. A few parcels of siftings have been sold at current quotations.

3,453 packages of Java were offered. With one or two exceptions there was a good market for all grades at fully steady rates.

Coffee *v.* Tea.

IT is anticipated that the campaign now being carried on by the Brazilian propagandists is likely to considerably improve the demand for coffee in the United Kingdom, especially as it is claimed that coffee is more of a digestive stimulant than tea. If this claim can be substantiated, it will be likely to have a very prejudicial effect upon the consumption of tea in this country, and India and Ceylon producers may find that Brazil's opposition will be quite as serious to their interests, if not more so, than that offered by their Chinese competitors, whose activity, however, is becoming more and more apparent. Meanwhile, judging by the articles that are daily appearing in the leading papers, Brazil, apparently, means to spare neither pains or money to achieve her object.

The London Cocoa Market.

By THE EDITOR.

No doubt it is difficult, as regards cocoa, to compare the closing weeks of 1908 with those of the previous year. In 1907 everyone was so famished after the long fast that, when November and December came along, all available cocoa was greedily snatched up so as to equalize as much as possible the lean months earlier in the year. During 1908, on the other hand, manufacturers seem to have laid up stocks before the end of October, so that when we close the year, with an increase in our home consumption deliveries of only 800 tons against the-end-of-October increase of 2,037 tons, it must be remembered that the average of the year on the whole has been very good. Here are the figures for the United Kingdom as a whole:—

Raw Cocoa—	Landed.	Deld. H.C.	Exported.	Stock, Dec. 31st.	
12 months—					
Jan.-Dec., 1906—	23,207	19,816	5,109	2,746	tons.
,, ,, 1907—	25,495	19,888	4,978	2,873	,,
,, ,, 1908—	29,903	20,720	6,230	5,529	,,
Increases	4,408	832	1,252	2,656	,,

In December only 1,572 tons were delivered for home consumption against 2,147 in the previous year, and 1,338 tons in 1906. With exports, 372 tons were shipped against 300 in 1907, and 367 tons in 1906.

Coming to the question of consumption generally, the latest figures to hand work out as follows, the feature being that America, after all, is ahead of 1907, instead of being 50 per cent. behind, as she was at the end of March (see TROPICAL LIFE for June, p. 96). Germany and France are, I regret to see, still behind; perhaps they will have taken a sprint during December and so close the year making a better show, for in such times as we are now going through, with heavy outputs on all sides, four or five thousand tons make a difference. The figures work out as follows:—

		1908.	1907.	1906.	
U.K. (raw only)	12 months ..	20,719	19,842	19,816	tons
U.S.A.	12 ,, ..	40,568	35,250	39,180	,,
France	11 ,, ..	17,918	20,809	20,812	,,
Germany	11 ,, ..	30,760	32,118	32,277	,,
Holland	11 ,, ..	23,140	19,066	17,888	,,
Belgium	11 ,, ..	5,800	5,401	5,354	,,
Spain, Austria-Hungary, Italy	10 ,, ..	8,741	8,105	8,478	,,
Switzerland	9 ,, ..	4,420	5,700	6,690	,,
	Totals ..	152,066	146,291	150,495	,,

So far, therefore, the world-consumption shows an increase, in round figures, of nearly 6,000 tons over last year, and 1,500 over 1906—the previous record.

Last month I gave production figures of seven centres. At the time I had not those for the Gold Coast by me, or rather I was not satisfied with those I had received. At the end of May, *i.e.* in five months, that Colony had shipped just upon 11,000,000 lb. of cocoa, against 5,250,000 last year, and I was anticipating a total output for the year of 25,000,000 to 30,000,000 lb. By the end of ten months (October) the increase was only a little above 25 per cent., being not quite 14,000,000 lb. against 10,750,000 lb. in 1907. I understand, however, that the same ratio of increase in the output may be there, but means for bringing the produce down to the coast are lacking. It certainly is astonishing that in these days of progress and easy transport such a state of affairs should be tolerated, when there are so many excellent and reliable firms who could put down a portable line, or more permanent light railways, at a very moderate cost. Millions are spent, and at times wasted, "on spec," for a traffic that does not yet exist; whilst here on the West Coast of Africa we have cocoa, oil-palm produce, and other goods to be transported coastwise, as well as imported goods to be taken inland, to a very considerable extent. Complaints are often heard as to the very low prices being paid to the poor natives for their cocoa; this, however, cannot be wondered at when the cost of transport must, in proportion, be very high.

Coming to the selling side of the question, prices, demand, &c., this, I maintain, remains very satisfactory, and prices are, all things considered relatively good. It is puzzling everyone to know why Hamburg is laying up cocoa to the extent that it is, for we are told that the speculative element there, not the manufacturers, are hoarding it up to a large extent. This has caused the market to be very strong, with a good demand throughout the Christmas holidays. What is the reason for this? Do they anticipate a rise in price, or are they—like men going on strike—laying up the sinews of war, on which to exist whilst keeping aloof of the market until prices have dropped 10s. or more? Whatever the reason, the result will be carefully watched.

Two factors that have contributed to strengthen prices are the lateness of the West Indian crops generally, and the very large proportion of the Trinidad output that has gone to America since October. The Havre figures, given below, are an eloquent witness of this, only 430 bags being landed there during the whole of December, whilst, on the other hand, 5,566 bags were delivered. Of Grenadas and "other West Indian" she did not receive a single bag. With the Trinidad output the crop so far has been cut up as follows:—

Trinidad Shipments.		To Europe.	To U.S.A.	Total.	Year's Crop Total.
Oct. 1st-Dec. 26th.	1908	17,902	36,102 ...	54,004 ...	— bgs.
,, ,,	1907	22,536	20,899 ...	43,435 ...	230,785 ,,
,, ,,	1906	1,979	10,928 ...	12,907 ...	180,871 ,,
,, ,,	1905	23,337	36,399 ...	59,736 ...	192,792 ,,

Want of space must cause me now to confine myself to the latest prices and stocks. According to the information to hand up to January 9th, prices ran as follows:—

Trinidads.—Fine good red up to 65s., but not lately. The last sales include middling to good red, 61s. to 63s.

Grenadas.—Picked lots sold on January 5th at 57s.; good to fine marks, 55s. to 56s.; ordinary unfermented to good fair fermented, 50s. to 54s. 6d.

Jamaicas sell low in proportion to Grenada, as they lack brightness and plumpness. Good dull red sold up to 53s. 6d. and ordinary down to 48s.

St. Lucias.—Good bright plump realized 55s. to 56s.; ordinary to fair, 50s. to 53s.

Dominicas did not do too well. The best sold up to 52s. 6d.; ordinary unfermented to good fermented, 48s. to 52s.

San Thomé are worth 53s. to 55s. for good to fine.

Bahias.—A few superiors sold at 57s., but cannot be valued above 55s. or 56s. for a large pile, whilst a substantial pile of good fair sold at 53s.

Costa Rica, not being bright enough to attract exporters' attention, rather drag, but 51s. to 53s. was paid for common to fair.

West Coast Africa.—A very nice bright polished lot, somewhat resembling fine Grenadas in outer appearance, was offered and realized, 52s. 6d.; whilst good washed sold at 50s., and ordinary to fair at 46s. 6d. to 48s.

Ceylon are now in full supply, and so far have met with a good demand at fairly steady prices for estate kinds, but "native" lots do not move off very easily. Substantial sales have taken place for estate kinds up to 75s. to 80s. for fine bold, 71s. to 73s. for good red, and 66s. to 69s. for middling to good fair medium. Some lots of good "native" realized 61s. to 65s.

Samoa.—Fine boldish sold at 76s.

Guayaquils, which topped all records by 100,000 quintales, as the following figures show, are now quoted, 61s. to 70s., and last sold at 69s.; Caraquez at 59s. to 62s., and some sold at 61s.; Machala 59s. to 61s., whilst some Manta realized at 62s.

SOME PRODUCTION FIGURES.

		1908	1907	1906
Guayaquil, Jan.-Dec.	qtles.	631,250	398,500	454,250
Trinidad, Jan.-Dec.	Bags	242,000	210,800	146,254
Grenada, Oct.-Dec.	,,	11,600	15,800	13,200
San Thomé, Jan.-Dec. (Lisbon)	,,	481,150	402,175	407,950
Gold Coast, Jan.-Oct.	tons	6,206	4,800	4,420
Bahia, Jan.-Dec.	Bags	490,000	350,500	381,850
San Domingo, Jan.-Nov. ..	tons	18,266	9,534	13,710

Guayaquils record was 1904, with 536,500 quintales for the twelve months.

The latest stocks at London and Havre were :—

London, Jan. 9th	1908.	1907.
Trinidads	10,988 ..	3,949 bags.
Grenadas	6,042 ..	4,252 ,,
Other W.I.	2,988 ..	2,716 ,,
Ceylons and Javas ..	16,554 ..	15,238 ,,
Guayaquils	18,028 ..	6,083 ,,
Brazils and Bahias ..	861 ..	343 ,,
Africans	10,043 ..	5,700 ,,
Other foreign	6,576 ..	6,086 ,,
Total	72,080 ...	44,367 bags.

Havre, December 31st :—

	1908. Bags.	Value. Frs.	1907. Bags.	Value. Frs.
Pará	6,722	76 to 78	4,192	126 to 132
Bahia	13,131	60 ,, 66	8,911	107 ,, 114
Venezuela ..	23,149	69 ,, 150	10,257	118 ,, 160
Trinidad ..	17,017	70 ,, 74	12,650	117 ,, 124
Other W.I. ..	6,109	60 ,, 68	5,650	108 ,, 117
San Thomé ..	4,317	63 ,, 67	2,361	110 ,, 120
San Domingo ..	27,127	58 ,, 62	403	103 ,, 107
Haiti	9,921	53 ,, 65	9,481	96 ,, 102
Accra	3,620	56 ,, 59	2,239	97 ,, 102
Guayaquil, &c.	25,140	G'l 70 ,, 82	15,337	G'l 122 ,, 134
Total ..	136,253 bags.		71,481 bags.	

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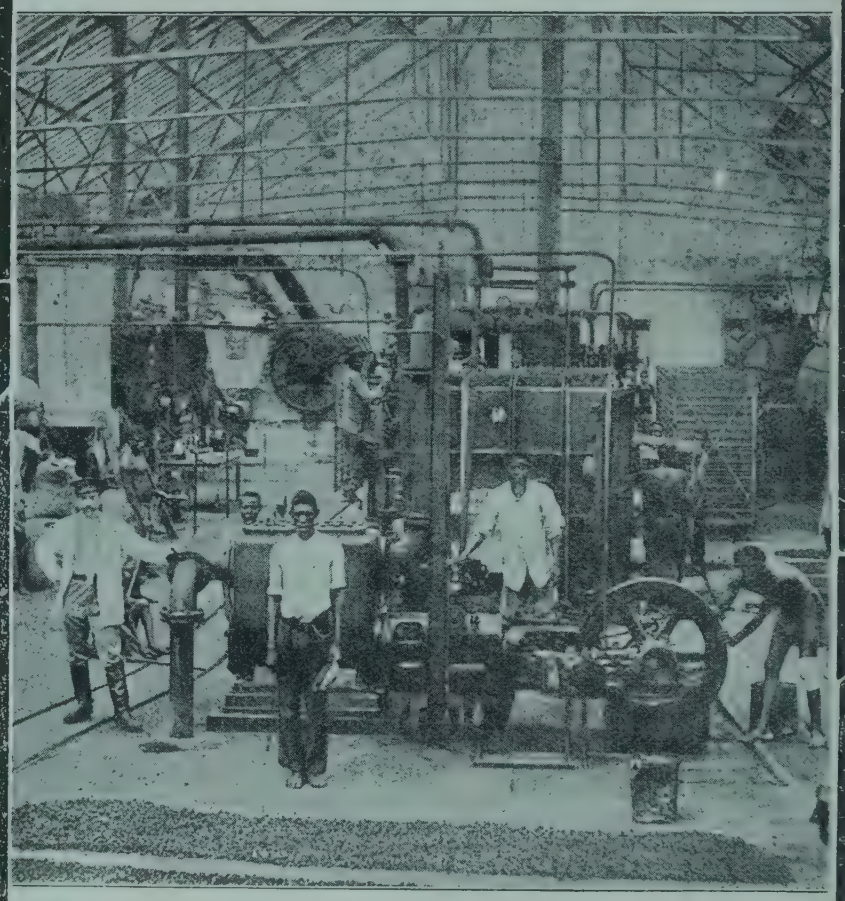

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Tropical Life:

A Monthly Journal devoted to the Interests of those living, trading, holding property, or otherwise interested in Tropical and Sub-Tropical Countries.

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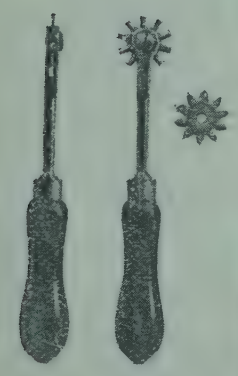

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The Tropical Exhibition.

PROPOSED "IDEAL MEAL" SECTION OF TROPICAL PRODUCE.

WE have suggested to the Committee of the Travel and Tropical Exhibition that they should take advantage of the presence at Olympia in July of the leading members of Society (of the political, scientific, commercial, travelling, tourist, sporting, and æronautical world), to push the sale of tropical produce, and to make a prominent feature of the benefits derived from including these especially in the form of concentrated foods and emergency rations in their outfits when abroad. Science and mechanical power have enabled the modern manufacturer to produce many forms of food-stuffs, of which even the most experienced traveller and explorer is hardly aware, and the ordinary sportsman or tourist probably has no knowledge of at all. It is to bring such products before these individuals that we have suggested that a Produce and "Ideal Meal" Section be added. What we should like to see are tables arranged by the various interests exhibiting, including cereal foods with fruits, milks, tea, coffee, or cacao, pure cane-sugars, condensed milk, milk-powder, &c., to be followed by confectionery, cigars, cigarettes, and tropical liqueurs, bitters, &c. In this way the different varieties and kinds can be pitted one against the other until perfection, or as near perfection as it is possible to attain, is arrived at.

The idea has been taken up with enthusiasm, and should turn out a great success. If this success is achieved the consumption of all tropical produce will be largely increased, and, as stated last month, by augmenting the purchasing powers of the planters we shall improve their demand for goods from this side. We therefore expect to be well supported in these our efforts to benefit both the producer and manufacturer, and, with their help, to make this part of the tropical section an unqualified success.

It is proposed to classify the exhibits under the following headings:—

(1) *Production, cultivation, transport,* including seeds, manures, implements, ploughs, machinery, irrigation plants, pest destroyers, refrigerating outfits, motor boats, land traction, &c. Wire-ways will, we hope, be a prominent figure, as being particularly suitable for transporting bananas.

(2) *The produce itself:* Tea, coffee, cacao, bananas, citrus and other fruits, cane-sugar, tobacco, cigars, cigarettes, &c.

(3) *The adaptation of the produce for everyday use,* both for residents in the temperate and tropical zones. Also concentrated and preserved forms of foods for travellers and others when weight and space are prime factors. Dried fruits and vegetables, meat extracts, concentrated coffee, cacao, tea, &c., will all be included,

those interested in the sales of these several articles competing together to make their exhibit the most prominent and attractive. The Indian Tea Association, the Ceylon Association, the China Tea Association, the United Fruit Company, the Coffee Propaganda, the Cacao Manufacturers, &c., have all been approached, and will, we hope, work with us to make this section a great success.

It certainly should be a success both to the exhibitors as well as to the public. The latter attend such an exhibition in large numbers, and this year especially, owing to the strides that ærial navigation has made during the past twelve months, the number of visitors will be very great. The fact that, among other celebrities, the Wright Brothers, Orville and Wilbur, have accepted an invitation, sent through the Æronautical Society of Great Britain, who are taking a leading part in the Sports Section, to visit the Exhibition, and that a special committee has therefore been appointed to organize a display, will alone attract thousands of visitors, ladies as well as gentlemen, to the Show.

These are just the class that the tropical producer badly wants to get into touch with, but cannot. Ordinary exhibitions do not interest them, sport and pastimes are alone in their line. Yet there is no one who attends to his diet like the true sportsman, or who needs the most nourishing and the best form of foods which the world can give. Lay before them, therefore, a fragrant, invigorating cup of coffee or tea, a cup of cacao, or cake of delicately flavoured chocolate (like Cadbury's Mexican chocolate, of which that mighty hunter and rough-rider, President Roosevelt, has ordered a supply to take on his big-game shooting expedition of which we are hearing so much), and you will probably secure a life-long buyer, and one only too ready to recommend you to his friends. Then there is fruit, the lack of which has caused much mischief, and its presence much gratification. Sportswomen, like most others of their sex, like to keep their good looks and clear complexion, and to do this should eat plenty of wholesome fruit, as oranges, bananas, grapes, &c. But as very few seem aware of this the growers and shippers of fruit need to point it out to them. Fruit is nearly always obtainable both at home and abroad, and can be eaten either alone or with condensed milk, or dissolved milk-powder custard, or with cereal food and milk. Fruit, one authority maintains, is better for the complexion than soap or any cosmetic, the pulp of grapes, apples, bananas, &c., being most nutritious, only the skins should not be eaten. All these, especially bananas which are rich in albumen, are excellent food for strenuous men and women, as well as for their less fortunate relations the gouty and rheumaticky members of the family. Pine-apples are said to be good for indigestion, and as a remedy for sore throats, whilst raisins and dates are healthy flesh producers.

The trade that we specially want to develop is the sale of bananas, as it is a fruit in which nearly every tropical planter is interested. The English and American tourist element have taken the demand to Egypt, where it is extending. This element will be in great force at Olympia in July, so we must further influence them in favour of bananas, and cause them to excite the attention of other countries towards the fruit. In colder Norway, Sweden and Denmark we are told that bananas are much appreciated. Sweden, with its sports, ski-ing, &c., has taken the whole of the annexe at Olympia, so will be very much on the spot for further conversion, and then there is France, Germany, and the Continent generally.

Fibre-culture in Victoria (Australia).

WE take the following from the report of the Minister of Agriculture of Victoria, Queensland :—

FLAX INDUSTRY.

The efforts of the Department towards stimulating this industry have had a very beneficial effect. This has been accomplished partly by imparting verbal information on the subject whenever the opportunity offered, but more especially by sending the flax mill to various agricultural and other shows, and treating the straw in the presence of the producers, thereby convincing them that they, too, with reasonable care and attention, may also produce and manufacture samples of marketable flax; and this has caused a larger area to be cultivated during the past season than previously, and very satisfactory results have been obtained.

There are now nine or ten mills established throughout this State, each owner treating straw of his own production, besides being in most instances prepared to purchase material from his neighbours. The Department's flax machinery has been loaned to a number of growers, who have desired to grow their own crops, and an officer sent with it to give the producer all necessary information regarding the working of the machinery and manipulation of the material, so that the growers may be enabled to manufacture fibre of their growing.

A mill has been erected by the Penal Department at Pentridge. The flax is purchased from the farmers by weight, and during the last season 340 tons were secured. The price paid is considered by the growers as satisfactory and to warrant them in continuing flax cultivation with a view of marketing it in this form. Messrs. James Miller and Co. have also erected machinery with a view to manufacturing binder twine direct from the unretted straw, which, if everything turns out satisfactorily, will necessitate their becoming purchasers of the raw material in large quantities, and this, by providing an additional market, will be an inducement to others to enter on the production of flax.

NEW ZEALAND FLAX.

A plantation of 50 acres of this fibre plant has been started at Leongatha. Six acres are two years old, and the plants are well established; the remainder were planted last autumn, and are making a good start. Nurseries have also been sown to raise the plants from seed. The roots were procured in New Zealand, and cost £6 5s. per thousand landed in Melbourne. The land is planted 10 ft. apart each way, the number per acre being 450.

The establishment of the *Phormium tenax* industry will be of great advantage to this State, but to be placed on a proper footing it will be necessary to erect a mill to treat the leaf so as to give confidence to those entering into its cultivation.

A fairly large area, say about 200 or 300 acres, is necessary to supply an ordinary equipped mill so as to keep it constantly going, but leaf may be brought from a distance where there is rail or water carriage available at a rate to allow of its being done.

The mills vary in capacity, but from 6 to 7 tons of green leaf may be passed through in a day, and it usually takes from 7 to 8 tons of leaves to make 1 ton of fibre.

MR. J. B. CARRUTHERS has resigned the post of Director of Agriculture in F.M.S. to be Consulting Mycologist to the Trinidad (W.I.) Government.

Cacao Cultivation. No. XV.

STUDIES IN CACAO DISEASE.

By J. HINCHLEY HART, F.L.S.

PART II.

IT may be noted that in recent works reference is made to a fungus determined as *Lasiodiplodia* sp., but that all writers have, to the present time, been careful to place it among the so-called *fungi imperfecti*, which means that its history is imperfectly known. *Diplodia* is also placed under this head, and it is to be understood that there is much more to be learned of its history than has yet appeared. Our examination of the original specimens, however, showed nothing more than the organs of *Diplodia cacaoicola P. Henn*, and hence it would appear that the latter is accountable for "Pod disease"—"brown rot," for "stem disease"—"die back," and for the "root disease" of young plantations. The same fungus, or possibly one nearly allied, has been detected by us on *Castilloa elastica*, causing a disease of the roots, on sweet orange stem affected with "root rot," and on the fruit of *Clusia rosea* in the open forest, which appears to be strong evidence that the fungus is indigenous to the Colony and widely distributed, although only brought to notice during recent years. It will be further noticed that in the lectures recently delivered before the Agricultural Society no mention whatever is made of any disease caused by *Diplodia cacaoicola*, although mentioned by many previous writers, and that the greatest amount of disease (even canker) is attributed to the action of *Lasiodiplodia* sp., for the determination of which only American botanists appear to be responsible, but which may probably prove to be a form of, if not actually identical with, the long known *Diplodia cacaoicola*. It will be remembered that the identical sample on which the determination was made was collected by the writer, who found nothing more in it than could be most properly ascribed to *Diplodia*. It is possible, of course, that some points found by others have been overlooked by him; but if so, it is full time that such points were fully worked out, so as to confirm the determination, or to rid us of the bogey of an undescribed disease which has recently been brought to our notice.

With regard to measures to be taken to control or prevent the spread of the diseases caused by *Diplodia*, I am in full accord with Stockdale, who writes: "This disease does not readily attack trees in a vigorous condition of health. Every effort should therefore be given to thorough cultivation, all diseased branches should be cut out and burned, and all wounds should be followed by an application of coal tar or some similar substance."[1] The rapid growth made by the spores, which it has been seen are capable of infecting a tree in a single hour, shows clearly how important is such advice as that given above, and not alone by Stockdale, but by all writers, among whom there is an agreement of opinion which necessarily adds to its importance. When it is seen and realized by the planters how dangerous must be the practice of leaving naked cuts or open wounds without a covering of antiseptic dressing, how dangerous to leave quantities of dead branches or prunings in the field capable of propagating the fungus by millions of spores, each capable of reproducing the disease in an hour, and how still more dangerous it is to leave heaps of empty pods infected with fungus to act as nurseries for the spread of the destructive organisms of such a fungus, they will readily forgive the earnestness which has induced students to lay the facts before the public. When the enemy is well known—and also the principles which retard, delay, or negative its power for mischief—a much better fight against disease can be maintained than would be possible were we in ignorance of the cause.

So far as we are yet aware, no application has been discovered which can give a radical cure; but, nevertheless, planters may, by keeping a course of high cultivation and by adopting "hygienic" and "preventive" measures, do much to prevent such diseases spreading, and to secure a certain amount of immunity for their estates, and they certainly have it in their power to prevent such a disease attaining to epidemic proportions. Further studies of controlling influences should be made, many of which are probably at work, though still unrecognized, such as the destruction of spores by insects—the "mite," the "cockroach," &c.—and certain fungi parasitic on the pest, but there are without doubt many other natural enemies to the growth of this fungus still awaiting discovery. There is no doubt that, under certain conditions, fermentation is very destructive to fungus spores; this points to the most suitable method of getting rid of the empty pods as disease-producers, by utilizing them for manurial purposes, and regular plans should be made for treating them on these lines rather than continuing the present negligent method, which so commonly prevails, of leaving naked heaps in the field. At present the disease does not seem to gather much headway, and this is probably due to natural checks upon its spread. The principal destruction caused by it appears to occur on poorly cultivated or inferior soils. Many contend that it is not present on their estate, but there are few plantations on which it cannot be found. It is not recognizable to the naked eye until the result of its mischief is evident in the death of the pod, branch, and root; but nevertheless it can be found by the expert in unsuspected places, as when unfavourable seasons have caused it to show itself with destructive effect. At such times, unless a proper watch is kept upon its action and progress, together with that of the equally insidious "canker" fungi, or *Nectrias* (from which, however, it is absolutely distinct), it is possible that it may become a very serious matter to that section of the planting community who are unwilling to adopt hygienic measures, and generally neglectful in the management of their estates. Unfortunately, too, a neglected estate can spread contagion among its neighbours, whose owners have taken every precaution to exterminate the diseases which have attacked their trees. At the same time, there is every reason to hope that, given clean, well-manured, well-drained, and well-cultivated estates, where hygienic methods obtain, planters have no need to become alarmed. One fact is certain, as seen in our last dry and unfavourable season: those estates where bad pruning, bad drainage, &c., prevail, and where "pick, pick, and keep on picking" is the first order of the day, will most assuredly be those which will afford least encouragement to the planter. Since commencing this paper, we have seen *Diplodia* on the grape and on grains of corn, and literature shows that in Europe species of it attack the holly, lilac, chestnut, mulberry, and various conifers. It is also reported to attack the Avocado pear, the sugar-cane, and the mango.

[1] This substance should be of an antiseptic nature.

The Origin and Domestication of the Peanut or Groundnut (*Arachis hypogæa*) in the United States.

By S. A. ANDREW.

PART I.

THE origin of the peanut is the subject of much controversy, though it is considered by many that it is probably a native of Brazil. Whether this statement be true or not, it is certain that it was cultivated extensively in foreign countries before its merits were recognized in the land of its origin. The merits of this now important crop were recognized by slave-dealers who loaded their vessels with it as food for their passengers. It was not extensively cultivated in the United States before the war between the States. The scarcity of rations during the latter part of that historic struggle fixed the highly nutritious qualities of this peer among nuts on the attention of the individual members of the various armies then in the field, and immediately after the war much attention was given to its cultivation, especially in the South. At the present time, 7,000,000 bushels of nuts are produced annually with a commercial value of at least $15,000,000, and it is safe to say that those grown exclusively as food for hogs, and which are not gleaned at the time of harvest, would add another $3,000,000 to the value of this crop. At the present time a large proportion of the nuts are eaten, not as a regular part of the daily ration, but at odd times by all classes of our citizens.

The peanut is admirably adapted for the production of oil, and might be used advantageously for various other commercial purposes, but the demand for it as human food has been such in the past as to effectively prevent this. Since there is almost an unlimited area of country admirably adapted to its growth, not only in the United States, but in foreign lands as well, and since its cultivation is not difficult, there is no reason why it should not be grown extensively enough to meet all demands. The highly nutritious value of the peanut, and its favour among all people who are familiar with it, lend colour to the belief that its cultivation under the best modern practice will long remain a profitable business. This should stimulate and encourage many farmers, who are favourably situated, to devote a portion of their land to this important crop. Moreover, the peanut has some special advantages which make its utilization as a rotation crop peculiarly desirable. It belongs to the family of legumes, and has, therefore, the power of gathering atmospheric nitrogen from the air in very considerable quantities. It produces also a rich and nutritious hay valuable for the maintenance of live stock. Since it is adapted for growth on rather thin and sandy soils as a rule deficient in vegetable matter, its power of largely obtaining its own nitrogen from the inexhaustible stores of the air is a most desirable attribute.

PEANUT HARVEST IN SUSSEX COUNTY, VIRGINIA, U.S.

COMPOSITION.

The richness of the peanut as a food is better appreciated when it is stated that the kernels contain about 29 per cent. of protein, 49 per cent. of fat, and only 14 per cent. of carbohydrates. Peanut vines with the leaves contain between 11 and 12 per cent. of protein, 5 to 6 per cent. of fat, and 22 to 32 per cent. of carbohydrates. They are thus more nutritious than timothy hay, and should rank with that made from red clover. Peanut meal, which is the residue after the oil has been extracted, is a foodstuff of high value, and is appreciated and extensively used in foreign countries. It contains something like 52 per cent. of protein, 8 per cent. of fat, and about 27 per cent. of carbohydrates, and, therefore, ranks above cotton seed-meal, which is one of the most richly concentrated meal found on the market to-day. Like other legumes, the peanut contains considerable amounts of nitrogen, phosphoric acid and potash, the latter two, of necessity, having to be largely supplied to the soil in a commercial form. But on the whole, the peanut, as seen from the foregoing statements, is one of the most desirable and satisfactory crops which can be grown.

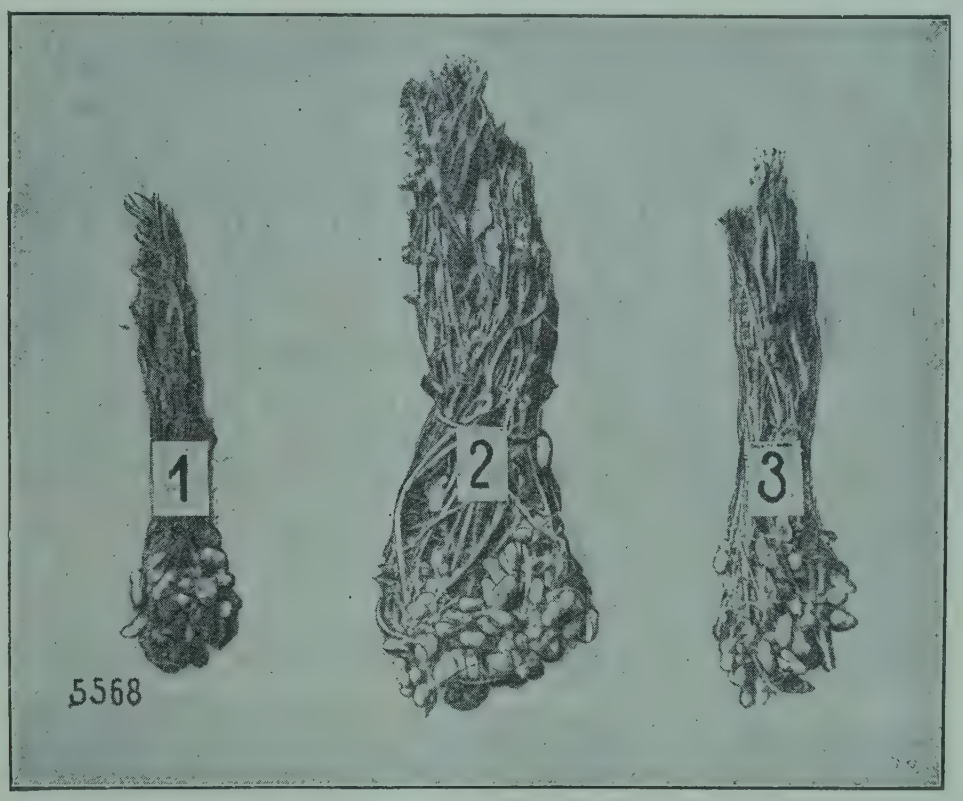
Soil and Climate.

The peanut prefers a rather sandy, loamy soil, which should contain enough vegetable matter to make it light and porous, and also to prevent its becoming too dry. Since the trade demands a light-coloured shell, nuts of equal flavour and quality grown on other soils do not find a ready sale; and it may be proper to state at this time that the peanut can be grown on a very wide range of soils, provided they contain a sufficient amount of lime. This information should encourage many, who only wish to grow limited areas, either for grazing down by hogs or for home use, to experiment with this important crop. There is an abundance of good peanut soil throughout the Atlantic seaboard. This area extends from New Jersey to Florida, and there is also much land on which this crop can be cultivated profitably in the Mississippi valley. Only a small proportion of the available land is now being tilled.

The peanut will thrive under a great variety of climatic conditions provided there is a season of at least five months free from frosts. It has been thought by many that the peanut only grows well in a warm climate, but this is an error, since the nuts develop chiefly during the cool weather in the late summer and early autumn. The weather conditions most favourable to maximum production are an early spring, warm, even summer temperatures, with a well-distributed rainfall, and a comparatively dry autumn. Of course, climate has an influence on the character and composition of the nuts, since it has been demonstrated that in tropical countries a larger per cent. of oil is obtained. As to any other influences which climate may exert, but little is known, and the subject has not been as extensively investigated as the importance of this crop would seem to justify.

Fertilizers.

Since the peanut is adapted for growth on a soil which is not naturally rich in any of the essential elements of plant food, the proper fertilization of the crop becomes a matter of the utmost importance. It was found at the Tennessee Experiment Station that 60 bushels of peanuts with a ton of hay would remove from the soil about 85 lb. of nitrogen, 15 lb. of phosphoric acid, 32 lb. of potash, and 47 lb. of lime. Of this amount, about 41 lb. of nitrogen, 6 lb. of phosphoric acid, 20 lb. of potash, and 42 lb. of lime were found in the hay, and since the vines would either be left on the ground or fed to stock, and the resulting manure applied to the land, the peanut is seen to be a comparatively easy crop on the land so far as soil exhaustion is concerned. Besides, as has already been pointed out, it gathers a large percentage of its nitrogen from the air. Since it has been amply demonstrated that the yield of the crop may be greatly increased by judicious fertilization, and since 100 bushels should be a fair average crop rather than the low yields now obtained, the importance of using sufficient amounts of all the essential elements to increase crop production and counteract the call made on the soil by the plant during the various stages of its growth becomes apparent.



Fertilizer per acre in lb.	—	..	201	..	— Muriate of potash.
	—	..	654	..	654 Superphosphate.
	—	..	144	..	144 Dried blood.
Yield per acre in bushels.	12	..	48	..	30

(Experiment by Geo. D. Grizzard, Grizzard, U.S.)

The needs of a crop of peanuts may be appropriately supplied by using 1,200 lb. of high-grade acid phosphate, 400 lb. of dried fish, and 400 lb. of muriate of potash. This would give a mixture containing 1·6 per cent. of nitrogen, 10·2 per cent. of phosphoric acid, and 10 per cent. of potash. It may be stated that this ration has been found one of the most satisfactory to use on this crop. Another mixture which has been tried quite extensively is 1,300 lb. of acid phosphate, 300 lb. of dried blood, and 400 lb. of muriate of potash. This mixture would contain about 2 per cent. of nitrogen, 10·4 per cent. of phosphoric acid, and 10 per cent. of potash.

(*To be continued.*)

Notes on Present Condition of the Castilla Rubber Industry.

By Dr. PEHR OLSSON-SEFFER.

PART II.

GENERALLY speaking, it may be said that the rubber zone of Mexico comprises the country south of 22° N. latitude, or the States of Vera Cruz, Oaxaca, Chiapas, Tabasco, and Campeche. Within this zone there is, however, only a comparatively small area suitable for rubber culture. The occurrence of wild rubber constitutes the best indication as to the possibilities of the land for rubber cultivation. Still this does not signify that it would be impossible to grow rubber on land or in a district where wild trees are not found.

Throughout the Central American Republics very little has as yet been done towards planting rubber. In most of these countries there is great unstability of government, and foreign capital is not attracted under such conditions. Labour conditions are also very unsatisfactory on account of the frequent revolutionary movements which sporadically crop up and draw the greater part of the able-bodied men to the ranks either of the Government or rebel armies. The question of transport also offers a serious drawback, and many prospective planters are deterred from settling because of the reported unhealthfulness of the climate. This latter is not worse than in other tropical countries, and with the advent of the Pan-American railroad, which will connect the south with the north, the country will be opened. In Central America there is plenty of land suitable for rubber planting. Three years ago I rode for days through good rubber country in Guatemala.

In this latter Republic very little planting of rubber has so far been done. In Northern Guatemala there is only one plantation of any account devoted to rubber. This is "El Baul," with some 20,000 trees over twenty years old. In some places *Castilla* has been planted as shade for coffee, for instance, on San Isidro, Gauchiplin, and other plantations. It can hardly be pronounced a success as a shade tree on account of its deciduous dropping of the leaves.

In the other Central American States rubber cultivation has been commenced on a small scale. In British Honduras, near Belize, *Castilla* is common in the wild state, and it has in some places been planted as shade for coffee, 40 ft. apart, and also as shade for cacao. In Honduras and San Salvador rubber has been planted as shade for cacao.

In Nicaragua there are a number of plantations, especially near the Pearl Lagoon, on the Bluefields and Escondido Rivers. The Government of this Republic a few years ago issued a decree offering a premium of 10 cents for every rubber tree planted, when the number does not go below 250 trees planted by any one person. The decree provides that the trees must be planted 16 ft. apart. Very few planters have, however, seen fit to accept this offer.

During the year 1904 the first attempts at collecting latex from cultivated trees were made in Nicaragua. These experimental tappings were made on a plantation about 30 miles north of Bluefields, in the Pearl Lagoon district. The trees tapped were raised in a nursery in 1897, transplanted in 1898, and in 1904, at an age of seven years, they measured 17 to 30 in. in girth, and 40 to 45 ft. in height. Of the 6,000 trees that were tapped the largest received three incisions, the medium-sized two incisions, and the small trees only one. The average amount of rubber per tree was 1½ oz.

Two years ago a devastating cyclone caused much damage to these old-fashioned plantations, and it is estimated that some 450,000 well-developed trees were broken and uprooted.

In Costa Rica several small plantations have been opened in recent years. In Panama rubber is now being planted, and in Colombia land has been taken up for rubber culture. The total area under *Castilla* in Central America did not exceed 12,500 acres at the beginning of 1907.

In Venezuela, on General Fonseca's plantation, *Castilla* is planted as shade for cacao. The experience there is that at about four to five years *Castilla* outgrows the cacao trees, and commences to give them a little shade. The experiment made by General Fonseca is often quoted for the purpose of showing that *Castilla* can be grown among cacao trees without in any way harming their production. Recent visitors to the estate in question claim, however, that neither the rubber nor the cacao looks as well as it ought to do, and consider this a proof that the combination of these two cultures is not successful. Near Guayaquil, in Ecuador, 20,000 *Castilla* trees were planted in 1884. In British Guiana *Castilla* has also been planted to some extent.

In regard to soil requirements *Castilla* needs an open porous soil, well drained, but with sufficient underground water supply. The chemical consistency of the soil or its relative richness is of little importance. Stagnant water or very acid soil are detrimental, and thin soil with hard, impermeable subsoil will grow *Castilla* for a few years, but when the tree reaches the age of six or seven years, and the roots penetrate deeper and reach water, growth ceases, and the tree is liable to die back.

The question of shade in *Castilla* culture has been much debated. In Mexico there are still three different methods in vogue. The first that was used in the early days of rubber culture was to plant in shade. It is based on an erroneous observation of Nature. *Castilla* was found in the forests, and as it is a comparatively low tree it was supposed that it required shade for its successful growth. It was also found that if the seeds were sown in the open without any shade the young seedlings often failed, or, if they survived the first dry season, they grew very slowly. On the other hand, seeds germinated very freely when sown in shade, and the seedlings grew rapidly, especially in height. The observant planter soon discovered, however, that the first year's growth was not continued, and as years went by he found that shade-grown *Castillas* developed into fishing rods without any increment in trunk growth. Moreover, the trees were sickly, often attacked by root fungi, and generally very liable to disease. There are still some planters who persist in keeping shade, enjoying the sight of 40 to 50 ft. high, whip-like trees, six to seven years old, but which never will reach a "tappable" size.

(*To be continued.*)

"I FIND TROPICAL LIFE not merely interesting, but extremely useful in my work here in connection with tropical agriculture in North Queensland, and I miss it when it does not come to hand."—Mr. Howard Newport, F.R.H.S., &c., Instructor in Tropical Agriculture to the Government of Queensland.

The Cultivation of Sisal (Agave Rigida).[1]

PART V.

SISAL plants, Mr. Watkins tells you, as has often been said, may be propagated from seeds, cuttings, or suckers. Bulbils, except in the early stages of the industry, are not recommended for propagating, as they lose time in coming to maturity, and also, according to some authorities, Sir Daniel Morris among them, being produced as an expiring effort of the parent plant, bulbils cannot always be calculated to produce such robust plants as suckers. It is generally considered that the most satisfactory and economical method of propagation is by suckers. A dearth of suckers, however, would make one very glad to make use of the bulbils, &c.

On this point of using suckers, those with an established plantation cannot pay too much attention to what has been printed on all sides about the necessity of removing suckers without delay, as they are ready to be weaned. This, and a knowledge of how to cut, when to cut, and when *not* to cut the leaves is of the utmost importance if you wish to make your estate a success. The life and bearing qualities of the plants greatly depend on the planter's experience on these points. Major Boyd tells you that the life of the sisal is intimately connected with the production of the pole which it throws up, and that the plant's life may be materially shortened by not cutting the leaves at the right age, or by over-cutting. Careful management can postpone the appearance of the pole for ten and even twenty years. It is also believed that the root suckers, if allowed to remain attached to the mother plant for a long period, tend to exhaust the latter, and to accelerate the period of poling. Some maintain that the regular cutting of the fully matured leaves retarded poling, and so prolonged the life of the plant.

Suckers, according to Boyd, should not be taken from a poled plant, for if left they will, after being planted out, send up their own poles, possibly within six months. The leaves of such a plant are quite useless, consequently the plant has to be removed, and a fresh one put in its place, causing the loss of a twelve months growth. When a mature plant surrounded by suckers sends up its pole, the older suckers at once follow suit, and send up slender poles, which will produce a small number of flowers and bulbils.

Shoots or suckers, Mr. Conter tells you, may be removed to the nursery when 8 to 10 in. long, or two may be left on each plant until 18 to 20 in. long for transplanting to vacant spots, in which case the rhizome must be cut, so as to separate the sucker from the old plant. All suckers not needed should be cut away, as they weaken the old plant, especially in the early part of the sucker's growth. Speaking of a poled plant, Mr. Conter urges that—as soon as it is 4 ft. high—it be cut away, just above the base of the upper leaves, as if left it becomes woody and difficult to cut. The cutting also prolongs the fibre-producing power of the plant another year.

As opposed to the setting out of suckers as quickly as possible, Mr. Edwards[2] states that on the Yucatan sisal plantations the suckers that are to be used for planting may either be taken from the old fields and set out at once in the new plantation, or they may be thrown in heaps, and allowed to lie in the sun for six or eight weeks. Suckers so treated are said to produce larger and stronger plants than when taken direct from one field to another.

According to Kew,[3] it was noticed that at the Grenada (W.I.) Botanical Station, where one-half of a sisal field had been planted with corn, that the small sisal plants shaded by the corn made far greater progress than those without shade. In the Bahamas, according to Edwards, similar results have been obtained with both corn and cotton. These crops are not only beneficial in furnishing shade, but they also keep down the weeds, and yield a catch crop.

(*To be continued.*)

[1] Messrs. I. P. William and Bros., Heneratgoda, Ceylon, write us that they are prepared to supply bulbils of the *Agave Rigida* var. Sisalana at the following rates, prices including cost of freight to parts where direct shipment can be made from Colombo, cash or its equivalent to accompany orders. This well-known firm claims to have shipped several million bulbils during the past six months.

1,000	bulbils	£7 0	per 1,000
5,000	,, ...	5 0	,,
10,000	,, ...	4 15	,,
20,000	,, ...	4 10	,,
30,000	,, ...	4 8	,,
75,000	,, ...	4 5	,,
100,000	,, ...	4 0	,,

[2] "The Cultivation of Maguey in the Philippine Islands." By Mr. H. T. Edwards. The above remark, however, referred to *A. sisalana*, and not maguey (*A. cantula*).

[3] Kew Bulletin, 1892.

THE LEADING ARTICLE IN OUR DECEMBER ISSUE.

THE *Morning Post*, commenting on our December issue, said: "The current number of TROPICAL LIFE contains a New Year appeal to young men with capital and energy to turn their thoughts from the over-stocked industrial enterprizes of cities and towns at home to places like South America and our own dependencies, where there is room for all, and where the mental and physical strain in the modern struggle for existence is not so much felt. It is pointed out that by assisting in the development of industries devoted to the production of raw material, they increase both the import and export trade of the Old Country."

MR. FRANCIS HARRISON, Commercial Attaché or Agent of the Natal Government, writes: "I must congratulate you on your excellent leader, 'The Coming New Year.' I shall be pleased if you will send me copies, to forward them to the Press in this Colony."

Rubber Blocking Machines.

A NECESSITY IN THE FACTORY AS ON THE ESTATE.

Le Caoutchouc et la Gutta Percha of Paris writes on the deterioration of raw rubber in the factory whilst being stored, and the heavy loss that the oxidation of their raw material causes the manufacturers every year. The matter, we are told, had been examined by Mons. W. Schellmann, who recommends that the rubber, after being washed, should be blocked, so as to reduce the surface coming into contact with the air to a minimum. We have always recommended the blocking of all raw rubbers for the same reasons. Comparative analyses of *Manihot Lewa* made by Mons. Schellmann when the rubber was first received at the factory and six months later, showed that the percentage of insoluble matter had increased from 3 per cent. to 27 per cent. Blocking the rubber, it is believed, would show a great improvement in regard to this heavy loss.

"Tropical Life" Friend.—No. 44.

HON. CHAS. LEOTAUD.

Doyen of Trinidad Cacao Planters.

"OUR FRIEND" this month was born in 1830, the same year (to quote the concluding paragraph in his "Reminiscences of the Trinidad Industry," which he published last year for private circulation) that cacao was sold as low as $1 per fanega in the country, or $1.50 to $4 in town, including expenses of cartage, &c., to Port of Spain (in 1907 the price touched $24). Cacao evidently presents an exception to the general rule that increased production means lower prices, for in 1830 Trinidad shipped only 1,300,384 lb., against 41,363,350 lb. in 1908. This fact alone will show what changes Mr. Leotaud has seen in the struggles of the Trinidad cacao industry.

In 1832, we are told, the cultivation of cacao did not even yield sufficient to allow the planters to buy bread, and as interest on loans ran from 30 to 40 per cent., their plight was miserable in the extreme. Not only was the cacao brought into town and bartered for food, but when that could not be done the owners even threw the cacao into the Dry River, near Port of Spain, as not being worth taking back to their estates. In those days, Paul Guiseppi and de Llanos cut down their beautiful cacao estates (Mr. Llanos alone had 25,000 trees) and planted sugar canes. Later on the reaction came, and when sugar did not pay on Llanos' property—now known as "El Socorro"—cacao was again planted.

After completing his education, "Our Friend," when he came of age joined the firm of Leon Agostini and Co. as a partner, leaving Port of Spain, the capital of Trinidad, for San Fernando, the second town and centre of the chief sugar districts. After remaining at San Fernando for eleven years, Mr. Leotaud came back to Port of Spain, and joined the firm of A. Ambard and Son, at that time one of the most famous of the Trinidad commercial houses. In 1882, "Our Friend" retired from A. Ambard and Co., and having invested in some cacao estates, started business entirely on his own account as a cacao planter and shipper, at the same time securing the agency of the French line of steamers, &c. From all one sees and hears of the firm of C. Leotaud and Son since that time, its head has had no cause to complain of his decision.

For ten years, from 1865 to 1875, Mr. Leotaud was Mayor of San Fernando, and was then elected Mayor of Port of Spain, and at the same time he was a member of the Board of Education, and the Taxes Commission. In 1886 he was elected a member of the Legislative Council, a post he was admirably fitted for as merchant, planter, and citizen. When in 1904, after eighteen years unbroken service he retired from the Council, Mr. Leotaud was granted the privilege by His Majesty, of retaining his title of "Honourable" for life, in recognition of the eminent services that he had rendered to the Government of the Island and to the Empire at large. Local appreciation of his services at the same time was offered him, in the shape of addresses from the various Corporations, Associations, Councils, &c., on which he had taken a leading part for so many years, and a silver cup, of beautiful design, valued at £100, was presented to him.

As a leading cacao proprietor, Mr. Leotaud represented that industry at the Legislative Council, and also at the Agricultural Society. First as Vice-Consul, and later on as Consul for France, a post that he has held for many years, "Our Friend" has often rendered valuable assistance to that Republic; in recognition of which he was in February, 1901, invested by France's leading representative in the West Indies with the Cordon of Chevalier of the Legion d'Honneur, to the great satisfaction of all who knew him. As Vice-Consul, Mr. Leotand was twice decorated by the Ministre des Affaires Etrangères for his services, and later the Russian Government created him "Chevalier de l'ordre de St. Stanislaus," and the Compagnie Générale Transatlantique presented him with a medal for services rendered to the ss. *Canada*.

ACCORDING to the United States Census Bureau, the world's output of cotton last year, in bales of 500 lb. each, amounted to 16,512,185 bales, against 19,942,000 in 1906, 15,747,000 in 1905, and 18,803,000 bales in 1904. Last year's output was made up as follows:—

Country.	Bales.
United States	10,882,385
British India	2,444,800
Egypt	1,296,000
Russia	620,000
China	428,000
Brazil	370,000
Mexico	85,000
Turkey	80,000
Peru	55,000
Persia	51,000
Other countries	200,000
Total	16,512,185

THE Earl of Dundonald writes us: "Lord Dundonald presents his compliments to the Editor of TROPICAL LIFE, and is pleased to subscribe for a year to the Journal, which he considers is very well put up."

Business Notices.

1.—The address of TROPICAL LIFE is Messrs. BALE, SONS AND DANIELSSON, Ltd., 83-91, Great Titchfield Street, London, W.

2.—All **literary communications** should be addressed **to the Editor,** and accompanied by the necessary stamps for their return if not accepted.

3.—All **business communications and payments**, either for subscriptions or advertisements, should be sent **to the Publishers** of TROPICAL LIFE. Cheques to be crossed The Union Bank of London, Ltd.

4.—The Subscription, which is **Ten Shillings** per annum, may commence at any time, and is payable in advance.

5.—The Advertisement Department is at 112, Fenchurch Street, E.C., where all enquiries respecting advertisements, charges, &c., should be addressed to the Manager of the Department.

6.—Changes of address should be promptly notified.

7.—Non-receipt of copies of the Journal should be notified to the Publishers.

8.—The Journal will be issued on or about the twentieth of the month.

Tropical Life.

FEBRUARY, 1909.

The Trinidad Cacao Crop.

THE UNCERTAINTY OF ITS INCREASE.

Is it due to Disease and Debility ?

IN discussing the annual crops of the various cacao centres one often hears it stated that the annual Trinidad output shows no increase, or rather what it gains one year it often more than loses the next. For a manufacturer or a shipper therefore, who must be able to depend on his monthly supplies, much less his annual contracts, such a centre receives much less attention than its rivals, where the output not only can be depended upon to maintain the figures of the previous two or three years, but even to show an increase. We have often called attention to this matter, both in our own columns and elsewhere, but the figures to the end of 1908 just to hand, and prospects for 1909, show the same uncertainty exists to-day as it probably did in 1874, and before that. The only way one can show that the Trinidad output of cacao has steadily increased is by taking the quinquennial average, which works out as follows. But even to show this a vastly increased area has had to be planted ; it is not the old estates that show a proportionate increase or have even maintained their output, as in Grenada. Lack of attention to cultivation, manuring, insect pest, over-shading, &c., is still costing Trinidad one-half, if not two-thirds, of its possible output of cacao every year ; that is to say, that the quinquennial average of 1904-8 should have been 75,000,000 lb., if not 111,000,000 lb., instead of only 37,300,000 lb. as shown. Here are the figures taken from official returns. They may not agree with those compiled from private sources, but being based on a regular system of returns, serve as a means of comparison :—

		Quinquennial average.
1874	10,054,770 lb.	
1875	5,892,000 ,,	
1876	9,710,020 ,,	9,073,416 lb.
1877	9,452,059 ,,	
1878	10,258,304 ,,	
1879	12,168,092 ,,	
1880	11,475,530 ,,	
1881	10,495,860 ,,	11,428,444 ,,
1882	10,972,687 ,,	
1883	12,030,050 ,,	
1884	13,366,845 lb.	
1885	13,723,150 ,,	
1886	17,709,200 ,,	15,686,637 lb.
1887	12,599,040 ,,	
1888	21,034,950 ,,	
1889	15,167,325 ,,	
1890	20,292,125 ,,	
1891	15,762,015 ,,	18,738,513 ,,
1892	24,389,220 ,,	
1893	18,081,880 ,,	
1894	19,448,480 ,,	
1895	26,739,775 ,,	
1896	21,869,002 ,,	22,329,212 ,,
1897	21,995,235 ,,	
1898	21,593,570 ,,	
1899	24,809,460 ,,	
1900	29,901,632 ,,	
1901	21,454,184 ,,	27,419,721 ,,
1902	33,268,490 ,,	
1903	27,664,840 ,,	
1904	41,790,080 ,,	
1905	42,539,525 ,,	
1906	24,906,190 ,,	37,295,299 ,,
1907	35,877,350 ,,	
1908	41,363,350 ,,	

We have no returns for 1868, 1869, 1870, owing, we believe, to a fire, and should be greatly obliged if anyone would be good enough to supply us with them to complete our list. Leaving out these three years, the records previous to 1874 were :—

1863	7,014,337 lb.
1867	7,641,960 ,,
1871	6,447,380 ,,
1872	6,947,000 ,,
1873	7,686,880 ,,

The year 1874 was the first to exceed 10,000,000 lb. The figures show this did not occur again until 1878, after which no important increase took place until 1886.

Against the above it is well to note that the San Thomé receipts at Lisbon have all along shown a steady increase, not the serious fluctuations so noticeable as in 1906 with Trinidads. The San Thomé receipts were 476,000 bags last year, against 38,000 only in 1889, and Bahia exported 490,000 bags in 1908, against only 87,550 bags in 1889. With such examples, surely Trinidad should be doing much better as regards her output than is shown by the above figures.

The Question of the Cocoa Duty in the United Kingdom.

To the Editor of TROPICAL LIFE.

SIR,—Judging by speeches delivered in various parts of the United Kingdom, our attitude with regard to the duty upon cocoa is apparently misunderstood. We have never asked for Protection on cocoa, and for many years no change has taken place in the duty.

The duty on cocoa is raised for revenue and not for protective purposes. It is in the same category as the duty on tobacco, coffee, wines, &c. The duty differentiates between raw cocoa and manufactured cocoa, that upon raw cocoa being 1d. per lb., and that upon manufactured cocoa 2d. per lb. This difference is not primarily designed to give the home manufacturer an advantage, but to place him on an equality with the foreign competitor in the home market. In converting the raw material into manufactured goods, there is a large loss resulting from the removal of imperfect beans, dust, outer husks, &c., and loss of weight in roasting. It is to allow for this wastage that the differential duty, as between the raw

material and the manufactured product, is imposed. A similar differentiation exists in regard to tobacco, coffee, &c. On cigars double the duty is paid that is paid on unmanufactured tobacco, whilst on raw coffee the duty is 14s. per cwt., against 18s. 8d. per cwt. on roasted coffee. In each case there is a slight advantage to the British manufacturer. In the case of cocoa, it amounts to only 2 per cent.

But even this advantage is counterbalanced by the absence of any rebate or drawback on exported cocoa. On every pound of manufactured cocoa we export we pay 1½d. duty, the ½d. representing the difference between a pound of raw cocoa and a pound of manufactured cocoa. By the absence of drawback the home manufacturer is handicapped to the extent of nearly 6 per cent. in comparison with his foreign competitor in neutral markets. In Holland, for example, there is no duty on raw imported cocoa; in France and Germany drawback is allowed on exported cocoa.

The existing duty upon cocoa only illustrates the difficulty of applying tariffs with absolute justice, as between all the interests involved, and we are convinced that the removal of the present duty upon one of the important foods of the people would be a gain to the consumer, and would involve no loss to the manufacturer.

We may add that we have consistently advocated for many years the abolition of the duty on cocoa as on other articles of food.

Yours, &c.,

CADBURY BROS., LTD.

Bournville, near Birmingham,
February 11th.

The Negro as a Producer.

THE negro promises to be quite a factor for the white producer to compete against in the future, either with cotton (in Nigeria), cacao (on the West Coast), gold prospecting (in British Guiana), or as a general planter in the West Indies and elsewhere.

This race at last is receiving its due. Unbiased and unprejudiced officials and others, whose opinions carry weight, having come into contact with the "real thing" at work, now bear witness that if fairly paid and treated, the negro can work as well as any man, in all climates, and better than anyone else in the Tropics. He may not be so plodding as the Asiatic, but, taken as a whole, he is physically their superior, and in rough-and-tumble work the negro is in his element. In his lecture the other day, before the King of Saxony and other eminent persons, Herr Dernburg, the German Colonial Secretary, emphasized this when he pointed out that this and that flourishing industry was a "native industry." He relegated the superficial rubbish about the incurable laziness of the native to the "realm of fairy tales."

"Over 60,000 negroes are to-day," he told his audience, "working for us voluntarily in plantations and on the railways, and hundreds of thousands are busily employed on their own land. Where the negro is given an adequate wage he works as willingly as the European, and the desire to possess is the strongest of his instincts."

The trouble has generally been in expecting the blacks to work for the whites at a lower daily remuneration than the negro can pick up by attending to his own cultivations. Many also grumble, when they want cheap labour to cultivate their lands, at the apparent idleness of the negroes when they do not work incessantly on their own gardens. To maintain, however, as we have often known planters and their friends to do, that the negro is a lazy, thriftless being because a number of them loaf and cadge round the towns, is unfair. We have any amount of low-class whites doing that in any European or American town or city. The industrious ones are hidden up country away from view, too busy to be in the streets of the town.

Whilst we cannot imagine that West African cacao could be turned out superior, or even equal, to Trinidads, Guayaquil, &c., it is interesting to note that the *African Mail*, in commenting on the progress being made at the Gold Coast, states that at the Kumasi Agricultural Show: "The remarkable success of a native of Cape Coast in winning Messrs. Cadbury's silver cup prize for the best prepared cacao, as well as carrying off four other prizes. is a convincing proof of what proper instruction will do for the colony. As a matter of fact, the cacao exhibited was far superior to the samples of Trinidad, Grenada, Ceylon, and Guayaquil cured cacao beans brought there by Messrs. Cadbury's representatives. A significant fact is that the winner is working with Mensakoff Industries Co., a limited native company incorporated under the Companies Ordinance. The public are watching how much the cocoa, shipped by this company after treatment by this expert, will fetch. As the cacao of this firm will be shipped from Cape Coast, this and the impetus given to the manufacturer of soft palm oil by the new Fanti palm oil hand-machine, should bring a measure of prosperity to that ancient town," and, we would add, to the natives themselves, as well as to the manufacturers at home, since the purchasing powers of their African customers are, by these means, greatly increased.

We are very glad to see that the *Daily Telegraph* this month had an interesting article nearly a column in length on the Gold Coast. If the English Press generally would only give more space to authoritative articles on our Colonies, more attention would be attracted to them, and a larger amount of capital invested in reliable planting and commercial undertakings. As our contemporary very truly says, "all the main problems of the Gold Coast—probably of West Africa—are connected, directly or indirectly, with education, sanitation, and transport," and the greatest of these is perhaps the question of transport.

MR. THOMAS PRICE, Premier of South Australia, sometimes known as "Advertising Tom," claimed in a speech that "we have discovered a by-product which will enable a fowl to lay four eggs, where she formerly would lay only two." The price, if not a description of this wonderful food, is to be published in the *Agricultural Gazette* of the colony. We wonder whether Messrs. Spratt's Patent know of this? If not, TROPICAL LIFE must warn them, so that they can look to their laurels, and see if their patent chicken food will not make their customers' birds lay five eggs to Mr. Price's four.

F. H. D. writes us to say that he is disengaged. Is an expert rubber planter, having been two and a half years as Manager with the Rubber Estates of Johore, Ltd., and was for some years in Sumatra. F. H. D. has planted 1,000 acres, and prepared 350 more for planting, and surveyed and recommended for purchase as good rubber lands, 20,000 acres. Now compelled by medical advice to relinquish his work; he is open to proceed to any healthy centre and manage an Estate, or start new Company, &c.

Planting News from the Federated Malay States.

COCO-NUTS, CAMPHOR, CASSAVA.

The Rat Trouble again.

THERE is much to learn in the report of the third year's work of the Department of Agriculture of the Federated Malay States, which, although for 1907, has only just come to hand. The trouble is not what to write about, but what to leave out. The report is, needless to say, filled with important information on rubber, in fact, quite a decent-sized handbook could be written round it, and would prove of the greatest value to planters. This month, however, we must leave rubber alone, and only call attention to the paragraphs dealing with coco-nuts, tapioca or cassava, and rice, &c. Our readers must note how Mr. Carruthers, the Director, is warning everyone ahead to be prepared for rats, insects, and other pests, so that as soon as they appear, or wherever they have already made themselves felt, their destruction can at once be brought about. Those, therefore, interested in the sale of pest exterminators should do well to watch the Federated Malay States, and see that its planters are well provided with the necessary spraying machines, fluid, virus, &c.

Malaya, we are told, is especially fortunate in the climate, which is unsurpassed for rapid growth of vegetation; but these exceptionally good conditions are also in some cases favourable to the prosperity of insect and fungoid pests; and, the planters are told it is imperative that careful watch should be kept by all cultivators so that the earliest signs of disease, to whatever cause due, may be brought to the notice of the Department.

Every agricultural country has its peculiar climatic and soil conditions, and the Federated Malay States differ very greatly from any other country. The conditions of alternating sunshine and rain which obtain point to methods which may not be sound for other countries, where, with greater rainfall and with long droughts, methods may be useful which are not necessary or beneficial here.

The general health of cultivated plants was good; locally diseases by animals, insects, fungi and other causes did some damage, but there was no special outbreak of new disease or recrudescence of any already known pest. With definite knowledge of the various diseases already known, which attack our cultivated plants, and increased experience in methods of dealing with them, the danger of any pest sweeping over a cultivation unchecked and seriously crippling the industry is greatly reduced.

The acreage under coffee has increased a little, there being 10,833 acres this year (1907) as compared with 9,708 at the end of 1906. A large acreage of coffee is continually being killed out by the rubber trees, with which it has been interplanted, growing up and shading the coffee bushes so that they do not grow vigorously, and only struggle in producing less and less fruit. Selangor possesses 75 per cent. of the whole acreage. The crops have been on the whole good, but the figure of acreage crop per acre is not of any value, as a great deal of the coffee grown under rubber is included, although it yields little or no fruit.

The cultivation of tapioca or cassava (*Manihot utilissima*), which occupies about 10,000 acres in the Federated Malay States, and more than double that area in the Straits Settlements, continues to give large returns to the careful planter. The tapioca plant is specially free from disease of leaf, stem or root, and its temporary cultivation makes it possible, should any pest attack it, to destroy the affected plants and thus prevent the spread of the disease. During last year experiments have been carried out to show the relative effect of different manures on tapioca, the results of which will appear in a future report. An investigation is being carried on in the scientific laboratories at Buitenzorg (Java) into the varieties of tapioca used in cultivation, and at the request of Dr. Treub specimens were sent from Malaya to be examined and experimented with.

The plots of camphor show that this plant will grow in Malaya at sea-level with great vigour. My experience of this plant in Ceylon was entirely different; there the most vigorous plants were some thousands of feet above sea-level, but the growth of the trees in Batu Tiga and Kuala Lumpur plots has been so extraordinarily rapid that there is no doubt of the suitability of this climate to the cultivation of this plant.

It is, however, well that the constant fear of attacks by insects, fungi, or other causes should haunt the cultivator. The paradise of the man who fears no devastating pest is but a fool's paradise, and the condition of the planter who by watchfulness and forethought prevents any evil getting the better of his plants or minimizes their effects, is in the end pleasanter and more profitable.

AGRICULTURAL ACREAGES IN THE FEDERATED MALAY STATES, 1907, EXCLUDING PADI AND HORTICULTURE.

	Selangor	Perak	Negri Sembilan	Pahang	Total
Coco-nuts	21,321	57,776	18,000	15,463	112,560
Rubber	61,552	46,167	17,656	860	126,235
Coffee	7,595	756	2,382	100	10,833
Other cultivations, chiefly tapioca	1,604	10,270	261	—	12,135
Total acres ..	92,072	114,969	38,299	16,423	261,763

Coco-nuts have had a prosperous year without any serious outbreak of disease, and the diseases which are already rife have been during the year successfully combated by the Inspector of Coco-nuts and his staff. It is not easy to estimate what damage would have been done to the coco-nut industry if the coco-nut preservation staff had not been in existence, and it is not, therefore, possible to give any idea as to the amount—no doubt very considerable—which this preventive and curative work has added to the wealth of the country.

An increase over last year of about 7 per cent. in the acreage of this staple industry shows that there is an appreciation of the profits which can be gained by the cultivation of coco-nuts.

This important branch of the agriculture of the Federated Malay States, covering at the end of last year 112,500 acres, is dealt with in detail in the report of the Inspector of Coco-nuts. During the past year, owing to the drop in rubber prices, there has been a tendency to take an interest in the "Consols of the East" cultivation, and land has been taken up which will be planted with this easily cultivated and profitable palm.

Cotton.

THE following were the prices for Cotton in London on February 11th, according to Messrs. Slann and Davies :—

	Good Fair.	Good.	Fine.	Superfine.	Good 1908.	Good 1907.	Compare
	d. d.	d. d.	d. d.	d.	d. d.	d. d.	
Surat kinds * ...	$4\frac{1}{8}$ to $4\frac{15}{32}$	$4\frac{3}{8}$ to $4\frac{3}{4}$	$4\frac{5}{8}$ to 5	—	$4\frac{3}{4}$ to $5\frac{1}{2}$	$4\frac{9}{16}$ to $5\frac{3}{8}$	per lb.
Madras	$3\frac{3}{4}$ to $4\frac{11}{16}$	4 to $4\frac{15}{16}$	—	—	$4\frac{3}{8}$ to $5\frac{1}{2}$	$4\frac{7}{8}$ to $5\frac{1}{2}$	—
Bengal	$3\frac{1}{2}$	$3\frac{3}{4}$	4	$4\frac{1}{8}$	$3\frac{13}{16}$	$3\frac{3}{4}$	—
Assam ...	—	$4\frac{3}{8}$	$6\frac{1}{4}$	$6\frac{3}{4}$	$5\frac{1}{4}$	$5\frac{1}{4}$	—
China	—	$4\frac{5}{8}$	$5\frac{1}{4}$	$5\frac{3}{4}$	$4\frac{7}{8}$	5	—
West Indian ...	$4\frac{3}{4}$	$5\frac{1}{4}$	$5\frac{3}{4}$	6	$7\frac{1}{2}$	$6\frac{3}{4}$	—
Sea Island ...	6	8	12	14	$11\frac{1}{2}$	$11\frac{1}{2}$	—
Australia	$5\frac{5}{8}$	6	—	—	$7\frac{1}{2}$	$6\frac{7}{8}$	—

* Liverpool quotations.

On February 11th the position of Spot Cotton in Liverpool was still unsatisfactory, indeed, it was rather worse, as with smaller daily sales the value of Middling American has fallen 6 points to 5·11d. "Futures" have fluctuated a little, and close 2 points down for near to 5 up for distant months. Messrs. Neill Brothers, in a recent circular, fully affirm their November crop estimate of 13,550,000 bales. There is as yet no improvement in the reports from Manchester, which describe trading as very difficult, and much of it unprofitable. Shippers of East Indian Cotton generally maintain their quotations, but buyers are reserved, and the business done is unimportant.

The import into Liverpool this week amounts to 166,732 bales; since September 1st, 2,821,855; same week last year, 82,954; last year's total, 2,480,085 bales. The estimated Sales amount to 37,000 bales. Middling American is quoted at 5·11d. per lb.; last year, 6·26d.; 1907, 6·03d.

The latest quotations of Americans for delivery bases, middling, any port, G.O.C., were :—

	Feb. 11th.	Last Week.	Last Year.
	d.	d.	d.
February	5·04	5·06	$5·81\frac{1}{2}$
February—March	5·02	5·03	$5·80\frac{1}{2}$
March—April	5·03	5·03	$5·80\frac{1}{2}$

Movement of American Cotton since September 1st :—

	1908-9.	1907-8.	1906-7.
Brought into sight	10,399,000	8,441,000	10,059,000
Exports from United States since September 1st—			
To Great Britain	2,625,000	2,291,000	2,585,000
To Continent, &c.	3,202,000	2,890,000	3,005,000
Total crop	—	11,571,966	13,510,982

Coffee.

By Messrs. C. M. AND C. WOODHOUSE.

THERE is little change to report in this market, and the small supplies offered in public sale this week (ending February 12th) realized steady prices. According to Messrs. Düüring and Zoon's report, the stocks in the principal ports of Europe on February 1st were 8,519,000 bags, against 9,652,000 bags last year and 8,510,000 bags on January 1st, 1909, being an increase for the month of 9,000 bags, against an increase of 245,000 bags at the same time last year. The visible supplies on February 1st were 15,379,000 bags against 16,330,000 bags and 15,177,000 bags in the two previous years, showing a decrease for the month of 440,000 bags against a decrease of 397,000 bags in 1908. The market for futures has been quiet, and prices show no change from those ruling last week. In New York and on the Continent, however, the market closes rather firmer, and the latest prices show some advance. We quote :—

		1909. To-day.	Feb. 4th.
London ..	Santos, Mar. dely.	30s. 0d.	30s. 0d.
New York ..	No. 7 Rio ,,	6·40 cents	6·25 cents.
Hamburg ..	Santos ,,	34 pf.	$33\frac{1}{4}$ pf.
Havre ..	Santos ,,	$43\frac{1}{4}$ francs	$42\frac{1}{2}$ francs.

The receipts at Rio and Santos from July 1st, 1908, to February 10th, 1909, were 10,613,000 bags, against 8,221,000 bags and 14,192,000 bags in the two previous seasons respectively.

The stocks in the principal ports of Europe on February 1st were estimated at :—

1909.	1908.	1907.
8,519,000	9,652,000	6,708,000

Sales include the following, viz. :—

Mysore.—50s. to 51s. for smalls, 53s. to 55s. 6d. for middling to good middling, 57s. to 62s. 6d. for good middling bold.

Coorg.—50s. for smalls, 54s. 6d. for middling, 59s. 6d. to 64s. for good middling.

Neilgherry, &c.—45s. for smalls, 53s. for low middling, 56s. for middling bold.

Wynaad.—56s. 6d. for good middling, 64s. for good middling bold.

East African.—27 bags at 47s. for medium, 52s. 6d. for bold.

Costa Rica.—900 bags, at 30s. 6d. to 55s. for ordinary to good smalls, 46s. 6d. to 55s. for good ordinary to middling, 61s. to 70s. 6d. for good to fine middling, 60s. 6d. to 70s. for middling to good middling bold, 75s. 6d. to 84s. 6d. for good to fine bold.

Guatemala.—420 bags at 45s. to 47s. 6d. for smalls, 52s. 6d. to 61s. 6d. for middling to good middling, 55s. 6d. to 67s. for middling to good bold.

Salvador.—20 bags at 60s. 6d. for bold.

Vera Paz.—85 bags at 52s. to 58s. for low middling to middling, 62s. to 73s. for good middling to good bold.

Sugar.

MR. C. CZARNIKOW, writing on February 11th, reported that further realizations of speculative accounts, quickened by favourable reports from Cuba, larger receipts in the six ports, and a decline in New York from 3.64 to 3.61 cents, only served to depress our market temporarily by ¾d. per cwt., May moving from 10s. 2¼d. to 10s. 1½d. to 10s. 2d. There were heavy floods in Germany, pointing to resumption of river navigation, but the weather has again become cold, and the clearance of waterways may be delayed. Meantime, there is just sufficient sugar from the Baltic and the Mediterranean to keep our refiners going, and though they reduced their own prices, they were unable to buy raws much cheaper. Actual 88 per cent. moved from 10s. 0¾d. to 10s. to 10s. 0¾d.; 80 per cent. seconds from 8s. 7½d. to 8s. 6¾d. to 8s. 7½d.

The Cuban quotation is now at the parity of about 11s. floating terms, United Kingdom, therefore still slightly above values here, and the weather in the Island is reported to be favourable for grinding. Willett estimates the total receipts up to January 31st at 238,000 tons, but it is probably difficult to get exact data.

Owing to greater capacity of machinery, it is not unlikely that some weekly receipts may exceed previous years, which need not mean a change in estimates; operators here would probably do better to take less notice of Cuba every week, because America is not likely to buy beet here, nor likely to allow much Cuban sugar to come here. The only final movement to consider is whether much Java sugar will be diverted to the United Kingdom in the summer, and that does not depend on America alone. The Eastern markets are quite as interesting; India requires sugar, and has lately even bought German granulated.

As expected, cane imports into the United Kingdom are increasing from Peru, Brazil, and the West Indies, owing to the low American prices, but Mauritius sugars are drawn Eastward, and Java is not exporting now to the West as last year.

The Board of Trade figures are for the first time made upon the new regulations adopted last autumn, which, unfortunately, are little known or understood, and it would be well for trade papers everywhere to enlighten their readers. The old system of entering goods according to countries of shipment was recognized as uninteresting and misleading (Javas *via* Holland appearing with Dutch beet), but in various fancy trades it was impossible to ascertain the country of actual production. It was therefore decreed that everybody should declare the country whence goods were originally first consigned to the United Kingdom (the country to which the United Kingdom gets indebted), agents and intermediaries not counting. Unfortunately, printed entry forms here demand declaration of place whence consigned, instead of the country of original seller or consigner, and everybody thinks that the place whence consigned must be the shipping port, which entry, however, was to be abolished henceforth. If Russians are sold for account of Russian principals f.o.b. Danzig, it is illegal to declare them as Germans, and proofs in the shape of a German invoice may at any time be demanded. If bought from United Kingdom intermediaries as Russian (and no sugar is sold without specification of origin), it cannot be entered as German, and hardly anybody is small-minded enough to consider wrong declarations (barely affecting the total) profitable, when correct figures are published abroad. H.M. Customs, in reply to the Trade's petition, very considerately seem willing to tabulate special sugar statistics if the Trade will declare separately—(1) the country whence originally consigned, and (2) the country of production; which countries, though generally identical, should be stated separately, and we trust the Trade will co-operate to obtain such special figures as really are of general and special interest, not totals of German-Austro-Russian imports all or partly mixed up.

Regarding probable beet sowings, the present forecasts are not worth much. It is generally expected that, owing to higher prices, we may see a small increase, which will be wanted, even if Germany and Austria have a better crop than the deficient weight of last year. With larger cane imports, and hardly any increase in consumption, we may start again with the reduced stocks of last autumn unless our shipments abroad fall off considerably.

The United States market has been dull, with only a small business doing. However, during the last day or two there are signs of some improvement, which the approaching spring should further develop. The Trade, in face of the now increasing Cuban supplies, continue their hand-to-mouth policy, and, with unusually small stocks in distributors' hands, requirements ought to become larger when once more accurate figures of the final Cuban yield are obtainable. It is hardly likely that prices in America, now so much below those ruling in the other markets of the world, can continue upon the present low level for any length of time, and when the Cuban pressure diminishes, we ought to see a gradual readjustment. In the meantime, the quotation for spot and near-at-hand sugar has receded to 3.61 cents for 96 per cent. centrifugals = 8s. 10½d. c.i.f. for non-preferential 96 per cent. = 7s. 10½d. f.o.b. Hamburg for 88 per cent. nett beet, while more distant deliveries are not obtainable thereat.

Transactions in cane-sugar in the United Kingdom are again chiefly confined to parcels arrived in the outports, and though lower grades of refining show prices rather in favour of buyers, the better descriptions command fully steady rates, especially for shipments still afloat. Grocery crystallized is slow of sale at unchanged values.

The advices from cane-growing countries are of little interest, except those from Cuba, where, in consequence of improved weather, hopes are now entertained that the crop will reach 1,300,000 tons, though this depends upon atmospheric influences. The accounts from Java are quite favourable, and there is little doubt that at least last year's results will be attained. From the British West Indies rain is reported in some places, which should benefit the canes, but will probably delay the crops. From Louisiana dry weather, with an unusually high temperature, is reported, which has stimulated the growth of ratoons, and cooler weather would be acceptable to check it; the new plantings have likewise been benefited.

Sales of British West Indian for the week amount to only about 2,000 bags, including crystallized Demerara, middling to good middling palish, 14s. 6d. to 14s. 7½d. duty paid; good yellow, 15s. 9d.; fine pale, 17s.; syrups, middling soft yellow, 13s. 9d. to 14s.; good yellow, 15s. Trinidad syrups, low dark and foxy-brown, 11s. 3d.

Native Penang (200 tons), to arrive, sold at 9s. 3d. London landed terms, in bond.

Crystallized Surinam (1,000 bags), sold, low bright yellow, 14s. 6d. duty paid; middling to good middling ditto, 14s. 7½d. to 14s. 9d.

In Liverpool, 14,600 bags Brazils sold at 8s. 3d. to 9s. quay, and 800 bags Peruvian syrups at 8s. 9d. to 8s. 10½d. quay; 200 tons Java at 10s. 9¾d. floating, landing, basis 96 per cent., Clyde.

The India-rubber Market.

By Messrs. S. FIGGIS AND Co.

THE end of January saw fine hard Pará selling down to 5s.; more distant down to 4s. 11¾d.; and soft fine about 4s. 10d.; Island, 2s. 6d.

Plantation. Malay (at public auction).—Sheet, good, realized 5s. 2½d. to 5s. 3d. Crêpe, good to very fine pale, 5s. 2½d. to 5s. 4d.; fair to good palish, 5s. 1d. to 5s. 2¼d.; other kinds 4s. 3¼d. to 5s. 0¾d.

Ceylon.—Biscuit and sheet sold, fair to fine pale, 5s. 2¾d to 5s. 4d. Worms, fair palish (one lot), 5s. 3¼d. Crêpe, fine pale, 5s. 3½d. to 5s. 4¾d.; fair palish, 4s. 11½d. to 5s. 2½d.; others 4s. 3½d. to 4s. 10¾d.

During the next week the market continued quiet at about above prices, but with firmer news from Brazil sales have been made at advancing prices, with buyers rather than sellers, hard fine selling at 5s. 2d., and soft fine at 4s. 11d.; after considerable sales at a 1d. to 2d. below this.

During the week ending February 12th, following the large business last week, further strong telegrams from Brazil induced considerable buying, and after fluctuations prices were 1d. higher, closing at 5s. 3d. for hard fine, forward 5s. 2½d., soft fine, spot and forward, 5s. 0½d.

At to-day's (February 12th) auctions good mediums are very scarce, and plantation was in great demand at 2d. to 3d. advance, the sales working out as follows:—

Plantation. Malay.—Sheet, good to fine pale, 5s. 5d. to 5s. 5¾d.; dark and immature, 4s. 9d. Crêpe, good to very fine pale, 5s. 5¾d. to 5s. 7¾d. (two lots fine white, 5s. 8¼d. to 5s. 8½d.); fair to good palish, 5s. 4d. to 5s. 5½d.; light brown and grey, 5s. 2d. to 5s. 3¼d.; clean dark brown, 5s. to 5s. 1¾d.; dark and specky, 4s. 9d. to 4s. 11¾d.; black soft, 4s. 0¾d. to 4s. 2¼d. Scrap, fair to fine, 4s. 5d. to 4s. 9¾d.; mixed, part inferior, 4s. 2d. to 4s. 3¾d.; virgin pieces, 4s. 10d. Rambong, scrap, 4s. 2½d. to 4s. 4d.; good crêpe, 4s. 8d. to 5s.; red block, 3s. 9d.

Ceylon.—Sheet and biscuit, fair to good pale, 5s. 5¼d. to 5s. 5¾d. (one lot very fine pale, 5s. 7¼d.). Crêpe, fine pale, 5s. 6d. to 5s. 7¾d.; fair to good palish, 5s. 4½d. to 5s. 5½d.; clean brown, 5s. 1½d. to 5s. 3d.; dark brown, 5s. to 5s. 1¼d.; black, part pressed, 4s. 1½d. to 4s. 7d. Scrap, fair to fine, 4s. 7½d. to 4s. 9¾d.; mixed, part inferior, 4s. 2d. to 4s. 4¾d.

Uganda Plantation.—Sheet, smoked dark, 4s. 10d. to 4s. 10½d.; rough lumps, 4s. 0¾d.

Orinoco.—Fair scrap, 3s. 1½d.

Mozambique.—Good red clean, very scarce and high; lamu ball, fair, 3s. 3d. to 3s. 4¾d.; sandy sausage, 3s. 3d.

Abyssinian.—Sheet, thin, part mixed, 3s. 2d. to 3s. 2¾d.

Nyasa.—Clean whitish ball, 4s. 2½d. to 4s. 2¾d.

Uganda.—Pears, 3s. 3d.; pressed sheet, 3s. 3d. to 3s. 7d.

Pará rubber statistics for the month of January (tons):—

	Pará.	Caucho.	1909.		1908.	1907.	1906.
Receipts at Pará ..	4,300	1,190	= 5,490	agst	4,860	3,780	5,710
Shipments to Europe	2,050	780	= 2,830	,,	2,550	1,450	2,480
,, America	1,890	320	= 2,210	,,	1,630	1,700	2,070

Crop statistics June 30th, 1908, to January 31st, 1909:—

		Pará.	Caucho.	1908-09.	1907-08	1906-07.	1905-06.
Pará Receipts	1908-09	18,360	2,880	21,240	19,100	18,500	20,400
	1907-08	16,530	2,570				
,, Shipts.,	Europe	7,760	2,050	9,810	10,740	8,080	10,804
,, ,,	America	9,910	710	10,620	7,180	9,520	7,915

Tea.

By Messrs. WM. JAS. AND HY. THOMPSON.

A DISTINCTLY more cheerful tone has pervaded both the public and private market during the past few days, demand continues unchecked, while the active competition for autumnal flavoured teas has been a feature of the auctions, which, this week, ending February 12th, closes all round at firmer prices for nearly all grades.

The statistical position continues to improve, as will be seen from the Board of Trade figures, and given a corresponding increase in deliveries for the next few months as has been shown in January, the prospects for the coming season are distinctly good.

With Indian tea the offerings were slightly larger than last week, 34,530 packages, compared with a considerably larger quantity, 41,767 packages last year. The total for the season to date (including South Indian teas since August 1st) being 1,058,858 packages; 1907-8, 999,516 packages. Many of the Darjeeling and Assam gardens are now nearing their close, and there was an interesting selection of autumnal invoices on offer from these districts, and also some very fine flavoured teas from the Dooars, which evoked strong competition, and sold at very satisfactory prices. Demand throughout the auctions was fully maintained, while towards the close there was an improved tendency for common descriptions which show an advance of ¼d. per lb. on last week, very little tea being obtainable under 5¾d. per lb. Finest grades continue to attract buyers at top prices, the supply of this class of tea being now limited. Cachar and Sylhet teas were in good supply and sold steadily at enhanced values. Travancores in sympathy with Ceylons appreciated, showing fully ¼d. per lb. advance on last prices. A large private business is reported.

The quality from many gardens being fine, some good averages resulted. The best were: Darjeeling—Pussimbing, 1s. 7d.; Rungmook, 1s. 2¼d.; Thurbo and Happy Valley, 1s. 1d. Assam—Sealkotee, 1s. 1¼d.; Limbuguri, 1s. 0¼d.; A. F. T. Co.'s Hilika, 1s.; Suddia Road and Nokhroy, 11¾d. Dooars—Carron, 11½d.; Lankapara, 11d.; Grandapara, 10¼d. The average price realized on garden account for the whole sale was 8¾d. per lb., compared with 8⅛d. per lb. last year.

We learn by wire that at the public sale held in Calcutta on Friday, 5th inst., 16,000 packages were sold at an average price of 4 a. 8 p., last year 6 a. 4 p. There was a firm tone throughout the auctions, and common qualities ruled rather dearer.

Importers of Ceylon brought forward 23,337 packages, against 18,937 packages a year ago; the total since January 1st amounting to 163,400 packages; 1908, 160,049 packages.

The moderate quantity met with strong competition, and in most cases last week's prices showed an advance. Leaf teas under 8d. per lb. were in most request, active bidding raising the market ¼ to ½d. per lb., while Brokens between 8 to 9d. often participated to the same extent, the commonest descriptions were in more request and may be quoted fully ¼d. per lb. dearer. Good medium kinds sold well, and the few flavoury sorts were firmly supported by the trade, especially where quality showed improvement. The best averages realized were some of the following gardens: Udaradella, 1s.; Henfold, 11¾d.; Cranley and Radella, 10¾d.; Campion, Hauteville, and Tillicoultry, 10½d. For the whole sale the result was 8¼d., against 7⅞d. last.

The London Cocoa Market.

By THE EDITOR.

WANT of space last month prevented my stating that the rapid development in the work connected with this Journal has caused me, with great regret, to resign the position of "Mincing Lane Expert" for cocoa to the well-known trade paper, *Confectionery*. My colleagues on that journal, with whom I have been working for eight or nine years, are, however, continuing the articles under the same heading, though contributed by another writer.

Since our last appearance I have been favoured with the well-known annual statistics issued by Messrs. Hogins and Lee, of the movements of cocoa in New York during the last six years. "The totals given," they say in a footnote, "of imports and consumption for 1908 should be considered in the light of exceptional market conditions. Cocoa arrived early in the year, which ordinarily would have arrived in 1907; while very heavy and unexpected receipts (largely sold prior to arrival) in December, 1908, also swelled these totals. It is questionable if the actual consumption of manufactured cocoa in 1908 really exceeded that of 1907." The deliveries for consumption are returned as:—

	1908.	1907.	1906.	1905.	
All kinds	557,420	493,513	524,571	342,609	bags
including					
Guayaquil	60,476	42,745	64,892	53,050	,,
Trinidad	101,702	94,750	75,175	57,757	,,
Caracas	45,226	42,532	50,786	30,309	,,
Surinam	13,604	13,236	12,529	19,279	,,
Bahia	102,209	109,802	133,884	69,469	,,
Sanchez	85,646	38,521	49,227	15,832	,,
San Thomé	92,824	78,503	60,379	31,991	,,

The figures do not show that the United States have as yet drawn on the Gold Coast for supplies to any noticeable extent. The returns of "Africans" other than San Thomé are given as 1,757 bags last year, against 5,895 in 1907. Previous to this the imports from thence, if any, were included in the item of "Sundry," which run from 2,500 bags to 5,900 bags, so that in any case very little "West Coast" has gone to the States so far. According to Mons. Anthime Alleaume, of Havre, Sanchez (San Domingo) exported 15,000 tons (of 1,000 kilos each) of cocoa last year, against 11,500 tons in 1907. The 92,000 bags taken by America is estimated to represent about half of the total exports from Sanchez. The *Gordian* of Hamburg claims that the San Domingo exports for the twelve months work out as follows:—

1908	41,914,160 lb.	= 18,711 tons
1907	22,383,780 ,,	= 9,993 ,,
1906	31,560,535 ,,	= 14,089 ,,
1905	27,852,318 ,,	= 12,434 ,,

The market remains in a somewhat perplexing condition. In spite of the bumper crops, and large visible supplies on all sides, the demand for cocoa continues unsatisfied, and as if there was not sufficient to keep pace with buyers' requirements. This does not mean that buyers are "cornered," and must pay any price to cover their contracts. That would be an ordinary state of affairs which anyone could understand. The great demand seems to be for superior Bahias, which buyers say are not being offered. Failing these they turn to fine Grenadas which they have steadily bought, stock, lock, and barrel, as soon as they appeared on the market. Other kinds benefited accordingly, especially West Coast (Africa), which have been selling freely up at Liverpool, as well as in London. The basis of prices for all this business can be put at 56s. to 57s., occasionally at 57s. 6d., when necessity compels. At 58s., however, they seem to draw the line. Up to now (February 13th) no fine Grenadas or superior Bahia have realized such a price, and even 57s. 6d. is seldom heard of; but at 56s., and even 57s., the European demand for this class of cocoa has been insatiable. After rather a slow week in mid-January, at the auctions on January 26th when 4,500 bags of Grenada were offered, the competition was decidedly keen, the home trade, the Government, and the exporters all being on the market. A considerable quantity of Trinidads have also changed hands, good middling and fair good red marks going at fully last month's prices to occasionally dearer. Fine to superior (66s. for "San Antonio") did not do so well in proportion. Heavy deliveries of Ceylons have been coming to hand, including some very serviceable piles of "Native." Increased supplies, however, far from pulling down prices seemed to have stimulated the demand, so that week by week their value advanced. This has, no doubt, been due to unfavourable reports from that island, causing buyers to secure what they could when the deliveries were coming forward so freely. Of Guayaquils there is little to say beyond quoting prices; sales of about 1,000 bags are reported, including Machala, at 62s. and 62s. 6d., Arriba, 69s. to 72s., Caraquez, 62s. to 64s., including Machala.

According to last business reported, and including the sales of February 9th, prices run as follows:—

Trinidads.—Fine to superior, 63s. to 66s.; good middling to good red, 60s. to 62s.

Grenadas.—Fine bright marks, 56s. to 57s. 6d.; good red, 54s. to 55s. 6d.; ordinary unfermented to fair fermented, 50s. to 53s.

Dominicas.—Ordinary unfermented to fair, 48s. 6d. to 50s.; good fair fermented to good bright red, 51s. to 54s.

Jamaicas.—Good to fine, 52s. to 55s.; common unfermented, 48s. to 49s.

St. Lucias.—Good to fine, 53s. to 56s. 6d.; common unfermented to fair fermented, 47s. to 51s.

Costa Rica.—Good red, 53s. to 54s. 6d.; fair reddish, 51s. to 52s. 6d.; ordinary, 48s. to 50s.

Samana.—Fair reddish, 50s.

Puerto Cabello.—Clayed fair, 82s. 6d.; good bold, 102s. 6d.

Bahia.—Barely superior, 56s.; fully superior and plump up to 57s.

Demerara.—Good hard reddish, 58s.

San Thomé.—Fine fermented, 54s. to 55s.

West Coast.—Fair to good reddish washed, 46s. to 49s. 6d.

Guayaquils.—Caraquez, 60s. to 63s.; Machala, 60s. to 63s.; Arriba, 68s. to 70s. Latterly, however, Caraquez has been selling up to 64s., and Arriba to 72s.

Ceylon.—Good to fine bold, 76s. to 83s. 6d.; fair to good medium and bold, 63s. to 72s. "Native" good bold, 57s. 6d.; finer and bolder, 62s. to 67s. 6d.

Stocks run as follows:—

London, February 13th—

	1909.	1908.	
Trinidads	11,827	8,447	bags.
Grenadas	9,666	8,111	,,
Other W.I.	2,775	3,330	,,
Ceylons and Javas	17,862	14,825	,,
Guayaquils	17,971	7,807	,,
Brazils and Bahias	802	934	,,
Africans	13,076	7,187	,,
Other foreign	6,249	5,479	,,
Total	80,228	56,120	bags.

Havre, January 31st.

	1909.	1908.
Pará	6,515 ..	6,169 bags.
Bahia	12,638 ..	15,446 ,,
Venezuela	22,173 ..	16,965 ,,
Trinidad	18,210 ..	14,904 ,,
Other W.I.	6,796 ..	3,512 ,,
San Thomé	6,821 ..	991 ,,
San Domingo	25,224 ..	2,982 ,,
Haiti	10,456 ..	4,909 ,,
Accra	5,224 ..	997 ,,
Guayaquil, &c.	26,431 ..	15,281 ,,
Total	140,488 ..	81,156 bags.
Stock, London, February 15th, 1907 ..		46,824 bags.
,, Havre, January 31st, 1907 ..		67,285 ,,

The full year's deliveries for consumption at the five chief consuming centres work out as follows:—

Jan.-Dec.	1908.	1907.	1906.
U.K. (raw only) 12 months ..	20,719	19,842	19,816 tons
U.S.A. 12 ,, ..	40,568	35,250	39,180 ,,
France 12 ,, ..	20,142	22,837	23,058 ,,
Germany 12 ,, ..	33,726	33,867	34,600 ,,
Holland 12 ,, ..	24,854	20,480	20,917 ,,
Totals ..	140,009	132,276	137,571 ,,

As stated at the beginning of the article, Messrs. Hogins and Lee, of New York, consider that it is questionable if the actual consumption of manufactured cocoa in America during 1908 really exceeded that of 1907. It is interesting to note how Germany, the same as America, has recovered the serious decrease she showed earlier in the year. Even at the end of November she was 1,350 tons behind, as the table given in my last report shows.

The sales on February 16th went off with good competition, and prices all round were higher, in some cases 2s. to 3s.; everything on offer sold, some 8,000 bags in all, except fancy kinds, and some Trinidads, for which the bids were not considered sufficiently high. Prices included Trinidads, 60s. to 63s. Grenadas, 51s. 6d. to 59s.; one lot 59s. 6d. Jamaicas, 54s. 6d. to 56s. 6d.; one lot 60s. West Coast Africa, 51s. for common, to 55s. for good bright; Costa Rica, 50 to 54s. 6d. Since these sales private business includes Trinidads at 60s. to 64s., Arriba Guayaquils, 69s. to 75.; Tumaco, 56s. 6d. to 60s.; Caraquez, 63s. to 64s.; Fine Java, 80s.

MESSRS. J. RUSSELL GRANT AND CO. report that the market for Malay and Ceylon Rubber Company shares was very active during the week ending February 4th, with advances in prices nearly all along the line. The demand has come from general investors, and in many cases their wants are difficult to supply.

During the next week ending February 11th the market was again active and firm, and a large amount of investment business was done. Owing to the steady price of the commodity, attention has no doubt been drawn to rubber shares. Prices have been on the up grade, with buyers predominating.

TEA companies and others have evidently taken note of our warning, and are waking up to the probabilities of a rise in the Tea Duty next Budget, for we hear that companies and firms representing the importation of more than 100,000,000 lb. of tea per annum have subscribed to the funds of the Anti-Tea-Duty League for a 1909 campaign.

EMIL PASSBURG, BERLIN,
Manufacturing Engineer.

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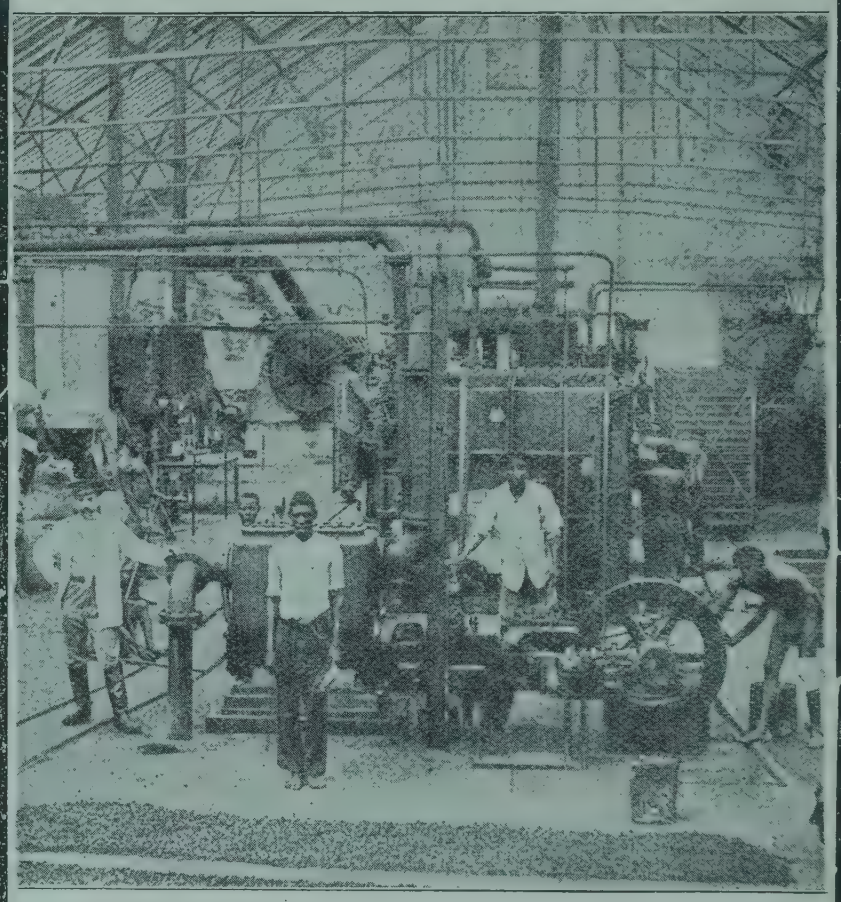

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Tropical Life:

A Monthly Journal devoted to the Interests of those living, trading, holding property, or otherwise interested in Tropical and Sub-Tropical Countries.

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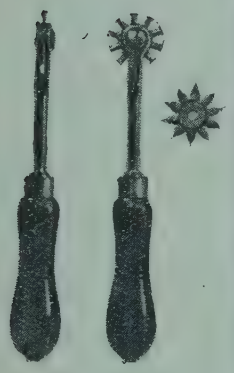

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San Thomé Cacao Tabooed.

ON p. 47 we give full particulars of the determination of the three largest English cacao manufacturing firms, to refrain from buying cacao from San Thomé or Principé, until the reforms asked for have been carried out. Messrs. Epps and others are also refraining.

Will the Tea Duty be Raised?

THE Earl of Crewe (Secretary of State for the Colonies) speaking at Stoke, on March 13th, showed himself to be in favour of increasing the duty on tea, should the revenue of the country have to be increased. "Because a man is poor," he told his audience, "he never thought that he should pay no taxes at all, he ought to pay in proportion to his ability to bear the burden. He thought that tea was not a food but a stimulant. He had never desired to see tea altogether untaxed, the money had to be found for these social reforms."

Many of our readers have written urging that TROPICAL LIFE has been too insistent on the danger of an increase in the tea duty. In face of the above we ask whether we have been insistent enough, and would call our readers special attention to our leading article on the subject which appears on p. 41.

Important Move in London for the Encouragement of Tropical Agriculture.

IN continuation of our December leader, knowing the interest that the London *Standard* takes in affairs overseas, we addressed the following letter to the Editor, who lost no time in publishing it:—

BUREAU OF AGRICULTURE.

Plea for Establishment in Metropolis.

To the Editor of the *Standard*.

SIR,—The tendency for the lower classes in England to flock into the towns and swell the already overcrowded labour market continues unabated. Unless more bread-winners can be induced to turn to the land as a means for themselves, or for their sons, to earn a living, our population will either decrease, as it is doing in France, or we shall have more mouths than we can properly feed, as seems to be the case in some of the German and American centres.

The best, perhaps the only, way to avoid this trouble is not by reducing the level of comfort to such a degree as to drive our best farm labourers, artisans, or factory hands out of the country, but to encourage the sons of the middle and upper classes, who have capital at their disposal, to turn their attention, in a far greater degree than they are doing at present, to agricultural and commercial enterprises abroad. Such men, whilst supplying us with a large proportion of raw material—a proportion,

too, on which our manufacturers could rely for their supplies—would, at the same time, increase the demand for our manufactured goods, machinery, estate supplies, provisions, &c., in exchange for their raw cotton, cocoa fibres, &c., as well as rubber, coffee, and so on.

For this reason I was very glad to see that Manchester, last year, so emphatically expressed its appreciation of the work that Sir Daniel Morris and his colleagues had been doing in the West Indies. Sir Daniel, it is true, has lately resigned, but the work still continues under his able successor, Dr. Francis Watts. The Oldham Chamber of Commerce is, I am glad to see, proposing the following timely resolution at the annual meeting of the Association of Chambers of Commerce of the United Kingdom, to be held in London (Hotel Métropole) during the first week in March: "That this Association strongly urges on His Majesty's Government the importance of the establishment of an Imperial Department of Tropical Agriculture."

The work of the Imperial Department of Agriculture in the West Indies, together with the useful publications that they are constantly issuing at quite nominal prices, is the nearest approach under the British flag to the work being done by the Bureau of Agriculture and Statistics at Washington, and is undoubtedly the greatest impetus we have to attract men with capital to take up agricultural pursuits in the Tropics. What must be done is to establish a similar bureau in London, so as to give those on this side of the water the necessary desire to make a start over-seas. Such a bureau, however, must have the right man to direct its affairs. I believe we have such a man in Sir Daniel Morris, K.C.M.G., D.C.L., D.Sc., M.A., F.L.S., &c., who, having resigned the position of Imperial Commissioner of Agriculture for the West Indies, which he has held since Mr. Chamberlain created it in 1898, has now been appointed scientific adviser to Mr. Chamberlain's successor on all matters relating to tropical agriculture.

I therefore hope to see a bureau of agriculture and statistics established in London, with Sir Daniel Morris, or other official equally qualified to fill the position, at its head. This would help to increase the number of men interested in agricultural pursuits both here and abroad, each of whom would create absolutely fresh channels of demand for manufactures, and so, by giving more work to our engineers and manufacturers, permanently decrease the number of genuine unemployed at home.

I am, Sir,

Your obedient servant,

HAROLD HAMEL SMITH,

Editor of TROPICAL LIFE

(Member of the London Chamber of Commerce, Liberal Colonial Club (Sir West Ridgeway, Chairman), British Cotton Growing Association, &c.).

Soon after we wrote the letter, the following important motion was brought forward at the forty-ninth annual meeting of the Association of Chamber of Commerce of the United Kingdom, held at the Hotel Métropole during the first week in March, when Mr. J. C. Atkins (Oldham) moved: "That this Association strongly urges on His Majesty's Government the importance of the establishment of an Imperial Department of Tropical Agriculture."

A large part of the British Empire lay, he said, within the Tropics and contained immense tracts of the most fertile land in the world, which was largely undeveloped. These lands were capable of producing immense quantities of food stuffs and raw materials, which would bring prosperity to the inhabitants, and thus by increasing their purchasing power also benefit the Mother Country. The natives could be helped to grow more of the products they now cultivated, and new ones, suitable to the various climates, could be introduced. But, in order that this might be done properly, and to avoid useless expenditure, a thorough knowledge of the climatic conditions, the rainfall, the quality of the soil, labour supply, and transport facilities, &c., were necessary. That could only be done satisfactorily by a Government Department. In India and Ceylon, and in parts of South Africa, much good was being done by the Agricultural Departments, but there was no relationship between those different bodies, and there must be some central authority if the best results were to be obtained, so that the information and experience gathered might be available for the whole Empire. To ensure unity of purpose in the carrying on of such a department, it might be on an Imperial basis. From his connection with the British Cotton Growing Association, he knew the great difficulties which had to be contended with in the initial stages from want of information as to the climate, soil, and also of technical knowledge, and many mistakes were made and money lost. The same remark applied to many other products. The history of the British Cotton Growing Association and its results proved what could be done in developing the Colonies if proper methods were employed. It was only about seven years since the idea of growing cotton within the Empire was started. Now it had been proved that cotton of every variety can be grown under the British flag, and the industry had been firmly established. The most striking success in cotton growing had been in the West Indies. Modern methods of agriculture had been introduced, and scientific knowledge and research brought to bear. Planters had been advised as to the most suitable crops to grow in different localities, and the methods to be adopted to combat various pests and diseases, &c. The sugar industry had been revolutionized, cotton had been successfully introduced, and now the islands were prosperous. What had been done in cotton could surely be done in other commodities. Rubber, for instance, was being grown in many parts of the Empire, but much of it was of inferior quality owing to lack of knowledge. In the development of the Colonial Empire this country had too long adopted a *laisser faire* policy, and it was high time we wakened up and made use of the glorious heritage handed down to us. The natural resources of our Empire were enormous, and, if only properly developed, would bring prosperity to all. In order that this might be brought about it would be necessary to have agricultural departments in all the Colonies, and a central department in London, where all the information and experience that has been collected will be gathered together, and experts will be able to advise, assist, and direct on all matters in connection with tropical agriculture, somewhat on the lines of the Agricultural Bureau of the United States. The work should be concentrated in one department, whose sole object would be to develop the agricultural resources of our tropical possessions, acting in conjunction with departments in the Colonies, formed on lines similar to that in the West Indies. The cost of the central department would be borne by the Imperial Government, and that of the branches principally by the Colonies themselves. The Secretary of State for the Colonies had, he understood, taken the matter in hand.

Notes on Present Condition of the Castilla Rubber Industry.

By Dr. Pehr Olsson-Seffer.

Part III.

The second system as regards shading is to plant in semi-shade, that is, to leave a few high trees when clearing, expecting these to give a certain amount of shelter in the dry season when the *Castilla* has shed its leaves, and is exposed to the scorching sun. This method has been employed with a certain amount of success on some plantations, especially where the soil is liable to become hard and baked if exposed to the sun. It is the most natural, as *Castilla* in its wild state always occurs in the vicinity of other trees from which it receives shelter and shade. To establish such conditions it is not, however, necessary to leave jungle trees as shade, but by planting close the commensalism needed will be obtained. This can easily be overdone, and the planter has to exercise considerable judgment in regard to the distance at which he should plant. In localities where the soil is very moist or drainage imperfect, any shade whatsoever may prove dangerous to the health of the rubber, and it certainly will greatly retard the proper development of the tree.

The third method is to plant in the open. If the seeds are sown at an unsuitable time—that is, if the soil is not moist, or if no rain follows for weeks—complete failure in germination may result. If the district has a distinct dry season, the seedlings will suffer greatly during that time, in cases where they have not had a good growth before the rains were over. Otherwise there are no objections to planting in the open, and if this has been done fairly close, so that the young plants partly shade each other, they have under these conditions the best opportunity for a rapid development.

Another important question in regard to rubber planting is that of distance between the trees. Considerable difference of opinion exists in this regard, and, as is the case with *Hevea* planters, distances varying from 6 ft. by 6 ft. to 30 ft. by 30 ft. have their advocates among planters of *Castilla*.

I have concluded from experiments conducted with a view towards ascertaining the relation of distance between the trees and the weekly, monthly, and annual increment of trunk growth, that *as soon as the roots of the trees touch and become intermatted the growth of the tree is impaired.* But, on the other hand, we know that if *Castilla* trees are planted very far apart their growth is stunted, and when the trees become older their bark is exposed to the heat of the sun and to evaporation, caused by dry winds passing through the plantation. The result of this is that the bark cracks, the latex vessels shrivel, and no latex can be obtained. We then say that the trees are "sun-burned."

The question then arises—at what distance are we to plant? I decidedly condemn too close planting, as it leads to a disproportionately whip-like growth of the trunk. I would also emphatically warn against too open planting. I think the error of the latter practice is conclusively proved by the following instance that has come under my observation. Two years ago I visited a large *Castilla* plantation, on which the trees had been planted 21 by 24 ft. apart. The trees were five years old, and investigation disclosed the fact that a great percentage of the trees, especially those which had been growing on dry knolls or exposed places, had a bark very rough, scaly, and full of longitudinal fissures. The inner bark in which the latex vessels are situated, was dry, and the latex in the ducts had coagulated. In many places on the bark exudation of latex had taken place, and big drops or tears of latex had formed scrap rubber. The only way in which this condition of the tree could be remedied was to allow the weeds to grow up and underbrush to develop. This vegetation shades the trunk, and in due time new bark is formed and the old is thrown off. The process takes at least two years, and is successful only in cases where the cambium has not been injured.

In deciding about the distance at which to plant, we have to take the following two primary factors into consideration: the trees must not stand so close as to impede the growth of each other, and they must not be far enough apart to leave the trunks exposed to sun and wind.

From the above we obtain an indication pointing toward the method we ought to follow, *i.e.*, close planting and subsequent gradual thinning, according to the requirements of the trees. Besides fulfilling some of the conditions leading to a successful development of the rubber stand, this method has other advantages. It permits of a thorough system of selection which is not possible under the method of open planting in permanent situations. From a financial point of view close planting is decidedly superior to any other method. It has been proved that by proper management the intermediate rubber trees, which are not supposed to remain permanently in the stand, can be made to produce a sufficient quantity of rubber to render the system very profitable before the permanent trees can be considered productive. By close planting the danger of failures in the stand is reduced almost to *nil*, and this is important to the planter, as filling up failures in a young forest is both expensive and precarious.

There is always a temptation to leave too many trees in order to provide for a big side crop, but this should be resisted. A heavy thinning comes to the assistance of the best specimens of growth, and it must on no account be omitted or postponed. It is extremely difficult to lay down any definite rules as to thinning operations, but it has been conclusively proved that the general rules applied in scientific forestry in regard to silvicultural operations are fully applicable to the cultivated rubber trees. Rubber planting is nothing else but silviculture, and we should take our lessons from ordinary common-sense, and from results obtained from the extensive experience of the forest planter, carefully paying due attention to the particular conditions obtained in the Tropics and the peculiar nature of the rubber tree.

The method of propagating *Castilla* first employed was to sow the seeds in a nursery, and when the seedlings were four to six months old they were transplanted. Very often, however, transplanting was not done before a year after sowing; the plants were then from 5 ft. to 12 ft. high. The seedlings were cut 5 in. or 6 in. below the surface, and tapped, leaving a pole some 3 ft. long. Tied into bundles, these poles were carried to the field. With pointed stakes, holes were made in the ground about a foot deep, the pole placed in the hole, and the soil pressed close to the stem. When this planting was done carefully, and if rain fell within the next two or three days, not more than 3 or 4 per cent. of failures occurred. In places where the soil was somewhat sandy the failures were more frequent.

(*To be continued.*)

The Origin and Domestication of the Peanut or Groundnut (*Arachis hypogæa*) in the United States.

By S. A. Andrew.

Part II.

These mixtures should be used at the rate of 300 to 500 lb. per acre. Cotton seed meal may be used to supply the nitrogen, if desirable, and kainit, the potash, though owing to lower percentages of available plant food contained in these two substances, larger amounts per acre would have to be supplied.

Many planters will find it advantageous to apply some farmyard manure to their peanut lands, since a small amount of vegetable matter mitigates the harmful influences which sometimes follow drought periods, and increases the vigour of the plant without injury to the quality or quantity of the nuts. Of course, the excessive use of vegetable matter might prove injurious, but this will seldom, if ever, happen until the entire system of rotation now in vogue in the peanut belt changes radically. In fact, few peanut planters pay any attention whatever to the rotation of their lands, and grow the crop on the same area year after year. As a result, the nuts become small and inferior, and the vines tend to lose their leaves before maturity. A good physical condition of the soil is essential for this crop.

The importance of applying lime must also be emphasized in this connection, as there is comparatively little of the land devoted to peanuts which naturally contains enough of this important element. Lime may be applied in various forms.

Oyster shells are accessible to farmers living near the coast, and answer very well, though caustic lime is one of the best and cheapest forms in which to supply this element. Marl may be used in sections where there is an abundance of it, and it can be secured at a low enough cost. At least 30 bushels of lime may be applied per acre, and 100 to 150 bushels of marl. As a rule, lighter applications of lime made more frequently will prove the most profitable, and there is less danger of burning up the already deficient supply of humus when lighter applications are made.

A review of the fertilizer proposition, therefore, makes it clear that potash and phosphoric acid are the two most essential elements to be applied to this crop in a commercial form. That liberal applications also of these constituents prove profitable has now been fully demonstrated by scientific experiments and practical operations as well.

Cultivation.

The cultivation of the peanut is a comparatively simple matter. The seed-bed should be finely pulverized to a depth of at least 5 in. Rake up the land in the spring as soon as it is in proper physical condition to work, and then harrow and roll, or use a smoothing-board, so as to obtain a level surface, Keep the land free of weeds until planting time by occasional stirring. This will tend to increase the supply of moisture in the soil, liberate plant food, and ensure a vigorous growth of the crop as soon as germination takes place.

Peanut Harvest At Southera Pines, N.C.

The importance of selecting seed with care cannot be emphasized too strongly. The wonderful results obtained in the improvement of corn and various other crops indicate how much may yet be accomplished if the practice of seed selection is extended to the peanut. The seed should be selected from prolific plants, and should be carefully housed to prevent its exposure to unfavourable weather conditions. Only well-developed and perfectly mature seed should be planted, and it is very important that the seed be selected before the plants have been injured by frost. They should be allowed to thoroughly cure in the open air, and should then be stored in sacks in a dry, airy loft where they will neither heat or collect moisture. About 2 bushels of seed in the pod should be allowed for each acre of land. The time of planting depends largely upon weather conditions. Most of the crop is planted from April 1st to June, but planting may be done any time after danger of killing by frost is past. The seed is usually sown in drills, especially on land that has been well handled the previous year, and is comparatively free from weeds. The rows, as a

rule, are 3 ft. to 3½ ft. apart, and the kernels are placed from 15 in. to 18 in. in the drill, depending on the fertility of the land. Planting is now generally done with an implement somewhat on the order of a cotton-planter. In fact, machinery is fast superseding hand labour in the cultivation of the crop, which is an advantage in many respects, since the work can be done more perfectly, quickly, and economically by machinery.

The peanut crop is sensitive to the interference of weeds, and the land should therefore be kept scrupulously clean. It is important that the work be done early in the season, since the runners must not be disturbed after they form and spread. As a rule, the pods are laid by the middle of July or the first of August, and hence cultivation ceases about that time. It is all the more important, therefore, that land intended for this crop should first of all be thoroughly freed of weeds, and cultivated by means of surface-working implements with sufficient efficiency and thoroughness to keep the ground mellow and free from trash, until the time when cultivation ceases.

Peanuts in Stacks, Sussex County, Virginia, U.S.

As to the method of planting in the lowlands, ridge cultivation may sometimes prove the most desirable, but, as a rule, the peanut should not be planted in a bed. This statement is made advisedly, and as the result of both observation and experimental investigation.

Harvesting.

Peanuts must be harvested before frost falls, as it injures both the vines and the kernels. The crop is generally harvested by means of a plough without a mouldboard, and which has a sword-like cutting share attached to the side. The knife passes under the row without injuring the nuts, and cuts the roots. Men following behind the plough with pitchforks shake the nuts free from the soil and pile them in windrows. Other labourers follow and stack them around poles 7 ft. high, which are set at convenient places in the field. Care is taken to see that the vines do not come in contact with the soil, and the nuts are placed on the outside of the stacks. After the stack has been completed, it is carefully covered with straw or grass, as a roofing to keep off the water during rainy weather. After curing in these stacks for a period of twenty days or more, the peanuts are ready

Picking of Peanuts at Southern Pines, N.C.

to be picked. This work is usually performed by women and children, who are paid so much per bushel. It is slow and tedious work, and one of the greatest expenses of the peanut grower. After the peanuts are picked, they should be cleaned before being sacked, as they will command a better price. Most of the work of cleaning, of course, is done at the factory, which is proper, because of the facilities now available for the work. The peanuts, as a rule, are put in bags, which hold about 4 bushels, or 100 lb. Many attempts have been made to devise a machine which would pick peanuts, but most of those on the market at the present time cannot be regarded as altogether satisfactory, and it is likely a large part of the hand labour now necessary in preparing peanuts for the market will have to be continued for some time to come, though inventive genius will probably find a way out of this difficulty in the course of time.

Varieties.

There are a number of varieties of peanuts, which are cultivated quite extensively. The Virginia "bunch" and "running" are two of the most popular and widely known in the trade. Tennessee red and white are also quite extensively cultivated. The African variety is grown in North Carolina, and the Spanish in Louisiana. These are among the most satisfactory varieties cultivated at the present time.

Yield.

The statistics of peanut production in the United States show some rather surprising figures so far as yield is concerned. The very low average yield obtained at the present time indicates that there is good reason for seeking improvement in the methods of cultivation and fertilization of this important crop. Seed selection, as already mentioned, would undoubtedly have a great influence on increasing the yield; but, above all, it seems advisable at this time to again emphasize the importance of using liberal amounts of well-balanced fertilizers on this crop. If greater attention were given to the enrichment of the soil, which, as already pointed out, is not well supplied with available plant food, the present yield could undoubtedly be doubled, and in many instances trebled. It seems surprising that more attention has not been given to this important subject, since anyone may now obtain a fair understanding of the best methods to follow to insure the proper maintenance and nutrition of a given crop. The evidence at hand all goes to prove that liberal fertilization will prove profitable. While small amounts of nitrogen may be necessary, potash, lime, and phosphoric acid should constitute the "trinity" of the peanut grower.

A Manchester firm writes us: "It may interest you to know that your Journal is well read out in Ashanti; our representative came across it many times. Our Pará (Brazil) friends also seem to have a very kind regard for you."

Will They all Come to This?

With reference to the questions asked on Monday, March 8th, in the House of Commons concerning cocoa grown in the Portuguese Colonies of West Africa, Messrs. Suchard beg to state that they have not bought or used any of this cocoa for the manufacture of their chocolates and cocoas for a period of more than two years now.

The Unification of South Africa.

The Earl of Durham presided at a dinner of the Liberal Colonial Club at the Trocadero Restaurant on March 10th, at which Sir Richard Solomon, Agent-General for the Transvaal, was the principal guest. Others present included Sir J. West Ridgeway (whose acceptance of the chairmanship of the Club, in place of Mr. H. J. Tennant, resigned, on taking office, was announced by Lord Durham), Mr. H. J. Tennant, M.P., Parliamentary Secretary to the Board of Trade, and Mrs. Tennant, Mr. C. Trevelyan, M.P., and Mrs. Trevelyan, Mr. J. Walton, M.P., Mr. C. D. Rose, M.P., Mr. H. Greenwood, M.P., Lady O'Hagan, Mr. Hawkesley, the Editor of Tropical Life and Mrs. Hamel-Smith, Mr. and Mrs. Basil Williams, Dr. and Mrs. Moon.

Lord Durham said that they felt great satisfaction that it was owing to a Liberal Government that unification in South Africa had now become an accomplished fact.

Sir Richard Solomon said that never had the political outlook been brighter in South Africa than it was to-day; never had the feeling between English and Dutch been better; and never had the tie between South Africa and Great Britain been stronger. The real reason for the movement towards unification was the awakening of the people of South Africa to the fact that there could be no stability in its political, economic, or industrial conditions until some constitutional authority were set up to deal with inter-Colonial differences. The large proportion of the population were anxious that the natives should be treated with humanity and justice. The ultimate inclusion of the native territories under the direct control of the Crown, with the unified Constitution, was inevitable.

Sir West Ridgeway, Messrs. Hawkesley, Basil Williams, Frischer Williams, Hamar Greenwood, and others took part in the discussion that followed.

The two following orders are directly due to the recommendations we advanced last June at the Colonial Fruit Show of the Royal Horticultural Society, and which were afterwards embodied in our "Future of Cacao Planting": "Will you kindly negotiate with the proprietors of Ratin to forward me 15s. worth of Ratin No. 2, to arrive here at regular intervals of one month until further notice. I am losing from 10 per cent. to 15 per cent. of my cocoa from the rat pest, and other growers are suffering to the same extent, though I fear that they do not realize what it means." In the letter previous to the above, the same correspondent ordered from their merchants one ton of Ohlendorff's special cacao manure to experiment with on his estate, in order to increase the vitality of the tree, and to counteract the tendency of the young pods to drop off.

One result, says the *Daily Telegraph*, which Australians evidently hope will accrue from the visit of the American Fleet, is an influx of American settlers. In his last address to the sailors, Mr. Deakin is reported to have urged them to go still further west and south-west; in other words, to come to Australia and settle there. Surely this must be a mistake after we have heard so much of Australia for the Australians.

The Coming Budget and the Tea Duty.

The papers are still divided as to whether or no the duty on tea imported into the United Kingdom will be increased with the coming Budget. Among others, the *Daily Express* in its issue of March 10th published a very well-worded article, a column long, on the subject, but which did not contain a superfluous word. It should certainly go a long way to prevent any increase. From all we hear of the way in which the Anti-Tea Duty League has, since Christmas, been showing its teeth (which are much sharper and stronger than some of their critics show themselves to be aware of), there can be no doubt, if the tea duty passes the ordeal it has to go through unaltered, that the lion's share of the credit for its doing so will belong to them.

The Next International Rubber Exhibition.

Change of Date to May or June, 1911.

The Executive Committee of the above Exhibition, hearing that September, 1910, the original date fixed for the next show, was not convenient to some of those anxious to take part, took steps to ascertain the most suitable date for all sections of the industry. Careful enquiries showed that whilst the original date suited the majority, it was inconvenient to others who wished to be represented, and to whom May or June in the following year was preferable. As a result, and being anxious to meet everyone's wishes, the Committee have agreed to alter the date, and take this opportunity to notify the rubber world that the next International Rubber Exhibition will be held at Olympia, London, in May or June, 1911, and not during next year, as previously arranged.

The change, we understand, is not altogether unwelcome to the rubber machinery engineers who exhibited, for the new connections formed, and orders actually received, will keep them busy for many months to come. It is therefore as well to clear up the business resulting from the first show before starting on the next, which will exceed its predecessor in all ways—in scope, utility, and general magnitude. Applications for further particulars can be made either to the Organizing Manager (Mr. Staines Manders), 75, Chancery Lane, London, W.C., or to ourselves.

The Travel and Tropical Exhibition is making rapid progress. The British Cotton Growing Association state that they will require a floor space of over 40 ft., besides wall space for photographs, &c., and Messrs. Elders and Fyffes, Ltd., will be exhibiting bananas, &c. Full particulars will be given next month.

Ground Nuts in Burma.

According to the *Indian Trade Journal*, the cultivation of ground nuts has rapidly increased in Burma. During the year ending June 30th, the provincial total was 142,051 acres as against 78,743 acres in the previous year. The most striking increase was in Myingyan, where the area increased from 31,337 acres to 73,188 acres; in Magwe it rose from 42,542 acres to 54,900 acres, and in the Lower Chindwin from 1,789 acres to 4,958 acres. In Pakokku, Myingyan, and Meiktila efforts are being made to further the cultivation by the advance of seed through Government agency as agricultural advances, the value being repaid at harvest time.

Politics and Tea.

In their monthly report, Messrs. McMeekin and Co., in commenting on the state of the market through February, state: "There was a strong demand with a general hardening tendency throughout the month. It is rather curious that the United States of America, which last year furnished the originating cause of the serious and long-continued fall in the market prices of tea, through its financial collapse, should this year have been the means of contributing to an advance in prices. Extravagance, personal and national, has produced a condition of comparative poverty in not a few quarters, and the chiefs of national finance in London, Berlin, and Washington each find themselves faced with the difficult problem of how to balance a Budget which shows a declining revenue and a greatly increased expenditure. It is estimated that the Secretary of the Treasury in Washington may have a deficit at the close of the current financial year of no less than $135,000,000 (roughly £27,000,000). It is feared that Congress may reimpose an import duty on tea, and traders in that article have set themselves to get past the Customs' barriers as much of their product as possible." If this account is correct, America, England, and Germany will have a combined deficit in their Budgets of over £60,000,000 to make up between them. Meanwhile, speaking of the Old Age Pension scheme in the United Kingdom, which started on January 1 last, Messrs. McMeekin evidently consider that a substantial proportion of the £6,000,000 or £8,000,000, which, we understand, will be paid out during the next twelve months to the old folks, will go into the pockets of the producers and traders in tea, for they say: "Though at first they (the pensions) appear to have little bearing on the tea trade, it is probable that the increase noted in the home consumption of tea since the commencement of the year arises largely from the fact that some 600,000 old people scattered throughout the country have each had 5s. per week to spend that they did not formerly possess. They are doubtless returning a fair portion of the money through the Tea Duty as an unconscious thank-offering to the Chancellor of the Exchequer." If, as is often stated—half in joke, half in earnest—the bulk of the world's cheap butter supply is nowadays made from coco-nut oil, colonial and tropical enterprises should certainly get the lion's share of the millions that are to go to the old age pensioners, for, when one comes to think of it, the bulk of the money will go in bread, butter, tea, coffee, cocoa, and sugar. As for the bread, Canadian, Indian, and Argentine wheat will gain the benefit; and we have so much money invested in Argentina, that the Republic's prosperity affects us almost as closely as does Canada's and India's.

Our London *Chamber of Commerce Journal* for February reports that Sierra Leone is a good market for cotton goods, and also is constantly needing simple hand and power machinery—corn-shellers and grinders, rice-cleaning machines, and agricultural implements, as hoes, rakes, shovels, axes, &c. Sierra Leone should also be a good butter or butter substitute market, if the article can be purchased at under 2s. lb. retail. Chili largely increased her imports of wire in 1907. A firm in Halifax, Nova Scotia, asks for the addresses of manufacturers of refined pea-nut oil.

Yours very faithfully
H. A. Wickham

"Tropical Life" Friend.—No. 45.

H. A. WICKHAM, F.R.C.I., &c.,

Who brought the original Pará seeds to Kew.

THOUGH, owing to his modest and retiring nature, the subject of our sketch this month was not the most conspicuous visitor at the Rubber Exhibition at Olympia last September, he certainly was one of the most interesting. If the uninitiated had any doubts on this point they were soon dispelled by the quickness with which his book on Pará rubber sold out at our stall, so that even a second supply did not quite suffice for everyone's requirements.

What has made Mr. Wickham so prominent in the Rubber world is, of course, the fact that it was he whom the Government chose as Commissioner (on the recommendation, we believe, of Sir Joseph Hooker), to proceed to the banks of the Amazon to collect and send over, or bring back to Kew, some seedlings of the then but indifferently known Pará rubber-tree (*Hevea Brasiliensis*). This "Our Friend" did so successfully, that he was right if he said, looking round at the splendid assortment of rubber on show at Olympia, "If the Government had not sent me to the banks of the Amazon, the rubber industry probably would not be in the flourishing state that we find it to-day." At the time, however, neither the Government nor anyone else except, perhaps, Mr. Wickham, were able to realize the future of rubber.

"Right back in the sixties," Mr. Wickham will tell you, "I was a strong advocate for cultivating rubber. At that time, however, I was looked upon only as a visionary, and I found that if I did not meet with actual opposition, I encountered no more encouragement than I should have looked for had I appealed to a brick wall. Even the association of British produce-brokers looked with unfriendly eyes on the notion of cultivation of what had come to be regarded as one of the staple 'raw material' world products." Fortunately, a good and enlightened fairy turned up in the shape of Sir Joseph Hooker, of Kew. He looked upon the matter in another light, and had, when Mr. Wickham came closely into touch with him, already been trying to interest the Government in the matter sufficiently to induce them to send someone to India. Sir Joseph, it seems, was first attracted to "Our Friend" by his drawing of the leaf and seed of the Hevea tree, in a volume of "Rough Notes of a Journey through the Wilderness," published in 1871, nearly forty years ago.

Later, Sir Joseph Hooker interested Sir Clements Markham in the matter, with a result that a Commission for the introduction of "the tree which produced the true Pará rubber of commerce" was given by the Government of India. It was fortunate, as subsequent events proved, that in being appointed the Commissioner, Mr. Wickham was left unhampered by instructions.

Fortune favours the brave, and our determined friend, being the possessor of this qualification, went to the other side, and there on the Tapajos plateau, up the Amazon, where he claimed the best trees were to be found, awaited his opportunity which seemed to drop from the sky, just at the time when the seeds were ripening

To obtain permission to bring the seed out of Brazil was one thing, but to bring them in a manner that would preserve their vitality was another. Even to-day with fast boats it is no easy matter, but in the sixties, well—in all the wide world it was only "Our Friend," of this month, who thought it possible at the time.

In his interesting book Mr. Wickham gives a full account of what happened; suffice it to say therefore, here, that a steamer abandoned by two rogues in a place where it should never have been at all, gave Mr. Wickham the chance of getting the seeds out just as they were ripe.

"There was no time to lose," he tells you. "Hurriedly getting an Indian canoe, posting up the right coast of the Tapajos, and traversing the broad river—rather ticklish work in a small canoe at that season—I struck back from the left shore for the deep woods, the *Monte Alto*, wherein I knew were to be found the big, full-grown Hevea trees. As a matter of fact, the whole of the Hevea brought out of the forest by me for the Indian Government were from large-grown trees found in the forest covering the broad plateau, dividing the Tapajos from the Madeira rivers. I got the Tapürgo Indian maids to make open-work baskets, and getting as many of the men as I could, I daily ranged the forest and packed on our backs as heavy loads of seed as we could march under. I was working against time, as I had to keep my rendezvous with Captain Murray who was in charge of the steamer." This he kept, and was at last down to Pará, where he still had to get clear of the authorities, but a friend managed this, and finally, we are told, got clear away.

June, 1876, was a time of commotion at Kew; orchids, &c., were turned out to make room for the sudden and all-unexpected inroad of the Hevea; but Sir Joseph Hooker beamed, for once such an upset brought him pleasure. The Hevea responded to Mr. Wickham's care, for by the end of the month 7,000 of the plants were flourishing.

Business Notices.

1.—The address of Tropical Life is Messrs. Bale, Sons and Danielsson, Ltd., 83-91, Great Titchfield Street, London, W.

2.—All **literary communications** should be addressed **to the Editor,** and accompanied by the necessary stamps for their return if not accepted.

3.—All **business communications and payments**, either for subscriptions or advertisements, should be sent **to the Publishers** of Tropical Life. Cheques to be crossed The Union Bank of London, Ltd.

4.—The Subscription, which is **Ten Shillings** per annum, may commence at any time, and is payable in advance.

5.—The Advertisement Department is at 112, Fenchurch Street, E.C., where all enquiries respecting advertisements, charges, &c., should be addressed to the Manager of the Department.

6.—Changes of address should be promptly notified.

7.—Non-receipt of copies of the Journal should be notified to the Publishers.

8.—The Journal will be issued on or about the twentieth of the month.

Tropical Life.

March, 1909.

The Question of the Tea Duty.

With the end of the financial year close at hand, speculation is rife over the Budget. Fortunately for Mr. Lloyd George, revenue returns have somewhat improved during the last few weeks, but under the most favourable circumstances it does not seem possible that less than £12,000,000 of new taxation will have to be imposed; indeed, £15,000,000 will probably be nearer the mark. However that may be, there is no doubt that new sources of revenue will have to be found.

The interest of Mincing Lane naturally centres in tea and sugar, though there are not wanting those who declare that coffee and cocoa, and possibly rubber and petroleum, will receive unwelcome attentions this year. Lord Crewe, in a speech at Stoke a few days ago, seemed to drop a hint that he would be prepared to regard the increase of a duty on tea as expedient. He took the line that tea was not a food but a stimulant. He seems to have wished to protect himself, in advance, against the charge of taxing the food of the public. "Let us regard tea," he cries, "not as a food but as a stimulant." Stimulants are proper things to tax; but there are stimulants which are beneficial and in the highest degree suitable for universal consumption. Tea is pre-eminently such, and a tax which has the effect of reducing its consumption is bad from every point of view.

Fortunately, Lord Crewe's view does not appear to be shared by Mr. Asquith nor by Mr. Lloyd George, if we are to attach any value to the fact that the assistance of the Anti-Tea Duty League was applied for and gladly granted in the candidature of the present Chancellor at Carnarvon Boroughs but three years ago. And yet in spite of the implied hostage thus granted to the tea-drinkers of the country—in other words, to the whole country—neither the present Prime Minister nor his chief lieutenant have shown themselves in a hurry to redeem their pledges. The party was returned to power to prevent—so they tell us, an impost of 2s. a quarter on corn—2s. on 496 lb.—less than a tenth of a penny on the two-pound loaf. And such an impost was declared to "robbing the people." Yet 5d. a pound on tea is one hundred times that amount.

But there is another point of view. Has not the planter a right to be considered? Tea is above all things a British industry, founded in India and Ceylon by Britons, supported by British capital, and hundreds of thousands of British subjects are dependent on it for their daily existence. A high duty is directly opposed to the interest of producer, therefore, as well as consumer. When in 1904-5 the duty was raised by 2d., the average price of Indian tea dropped ¾d. lb., a fall that in many cases meant a dead loss on the cost of production. Even now, with a 5d. duty, the price is below the lowest average ever reached under the 4d. duty.

Can there be any clearer evidence that the Indian planter has had to pay part of the British import duty—that he is still paying it? Is it fair that he should do so—that he should help pay our taxes as well as his own? It is obvious that tea-planters must be up and doing; they must strengthen the hands of the Anti-Tea Duty League by every means in their power, and strain every nerve to prevent an increase in taxation, which is as short-sighted as it is immoral. While on this point we may allude to the contents of the last mails from Ceylon. We learn that at the annual meeting of the Planters' Association, at Kandy, a resolution was proposed by the chairman, and carried, favouring "hearty support being extended to the Anti-Tea Duty League by proprietors and others interested in the tea industry."

It is no secret that the Ceylon houses in London have been but lukewarm supporters of the League, and it was confidently anticipated that the assistance thus afforded from Kandy would have been recognized in London and followed by a satisfactory measure of support. We learn on enquiry here, however, that this is not so, and that apparently the London Association does not propose to endorse the action of the Kandy authority. If so, and the duty is increased, which there seems an additional chance of happening, in face of Mr. McKenna's and Mr. Asquith's attitude on the German naval programme, the fault will lie entirely at the door of those who refused to realize the danger that threatened the tea-planting industry when we warned them of it several months ago.

———

Tropical Life has made considerable progress of late in Brazil. From the start we have been urging on our plough-making friends to pay more attention to this market, the newly opened-up centres being specially worthy of attention. Consular reports confirm what we have all along been urging. At present the United States lead the way as regards agricultural machinery generally, and has greatly increased her exports. Germany comes second, while the United Kingdom is third, with a smaller actual and proportional increase. British ploughs, although higher in price than the American, are said to be superior in quality, and the sale of them is, we are glad to hear, increasing. The United States are, however, still far ahead of us, and her reversible disc plough is sold in large quantities, no British plough of this kind being apparently imported. Threshers, harvesters, reapers and binders come from the United States, and to some extent from Germany. The success of the United States is due to the fact that her agricultural machinery is adapted to a variety of conditions, is up-to-date, comparatively cheap, and widely advertised.

Artificial Manures and the Cotton Crop.

Following up our article in the January issue on the importance of nitrogen as a plant food, there can be no question that a very wide field for research is opened up; so much so that it would be very difficult for any practical cultivator of the soil to spare the time to read up and digest all the literature on the subject; for in these days of specializing the amount of books, pamphlets, and leaflets dealing with the various phases of the cultivation of every known crop are simply legion.

It is certain that nitrogen, in some form or another, is essential, and in this connection Dr. Paul Wagner, the celebrated German scientist, at the commencement of a lecture on "Nitrogenous Fertilizers and Net Profit," once said: "It has been said by an eminent experimenter and farmer that 'water and nitrogen govern the yield and the net profit'"; and in his lecture he goes on to prove this.

However true that may be, the fact remains that in addition to nitrogen other elements of plant food must be considered, such as phosphates and potash, and the following few suggestions on the fertilization of the cotton crop may not be out of place.

Let it be clearly understood that no absolutely hard-and-fast rules can be laid down. Soils differ and climates vary, and the planter must adapt general suggestions to his own particular conditions, of which he necessarily has special knowledge.

We will assume that the soil has been thoroughly prepared. The question then arises as to whether the soil contains nitrogen, phosphates, and potash in sufficient quantity; if not, they must all be supplied, and in as soluble a form as possible, so that they may be available as food to the plants from the outset of their growth. The majority of the results of experiments suggest the advisability, in most cases, of supplying all these constituents, unless, of course, one or other is already present in abundance. One thing must be kept in mind, that phosphoric acid should be present or supplied in abundance, if only on account of its powers in assisting the plants to assimilate the other constituents.

These fundamental principles may be said to apply generally to all crops in all countries, and while it is not intended, nor would it be possible, to set out in detail the various phases of the cultivation of cotton, yet we may go so far as to say that if the application of the nitrogenous and other manures is to have its full effect there must be careful cultivation, judicious seed selection and planting, and general attention to detail. The cotton plant responds promptly, liberally, and profitably to judicious fertilization, and though cotton may be, and is, *continuously* grown with profit and without impoverishing the soil, when it is adequately fertilized with chemical manures, yet it would seem that a three years' rotation—small grain, corn, and cotton—is, perhaps, the better method.

As has been pointed out, where early maturity is desired, it is essential that the fertilizers used should be in as soluble a form as possible. That being so, the following may be recommended as the constituents to be combined in a complete fertilizer for cotton: Superphosphate of lime, kainit, and nitrate of soda. Experience has shown that for an average soil in fairly good condition a judicious use of these three constituents will produce the best results, if applied in some such proportion as this, per acre:—

Superphosphate of lime (containing at least 14 to 16 per cent. phosphoric acid)	500 lb.
Nitrate of soda (in two or more applications) ..	200 ,,
Kainit	200 ,,

With regard to the method of application, it would seem that broadcasting is not so effective as is the thorough mixing with soil beneath the rows of plants; so that the whole of the superphosphate of lime and the kainit, together with half the nitrate of soda (100 lb.), should be thoroughly mixed with the soil in the furrow at a depth of about 3 in., and the remainder of the nitrate of soda (100 lb.) should be applied at the sides of the rows when the plants have been thinned to the final stand. It would be advantageous, where possible, to divide this last 100 lb. of nitrate of soda into two dressings of 50 lb. each, with a fortnight's interval, as it has been found that two or three moderate dressings at intervals of about ten days produce better results than a similar quantity applied in one dressing.

Since our January issue we have been studying the system of cotton growing in Egypt, and have been much struck with the fact that the Egyptian cultivator has evidently found nitrate of soda most efficacious. That this is so is proved by the figures for 1905-7.

In 1905, only 5,000 tons of nitrate were used in Egypt; in 1906, 10,000 tons; and in 1907 upwards of 20,000 tons! The conservative Egyptian planters would not have taken so large a quantity if they had not found that their neighbours, who had made a judicious use of fertilizers, obtained much larger crops. What the Egyptian cotton planter has found to be so profitable, the planter in the West Indies, Nigeria, and other cotton-producing centres cannot well afford to disregard, more especially as by ensuring the early maturity of his crop it is less likely to be troubled with weevils and other pests.

Those interested in our "Fertilization of Tea" should note that, according to the French Consular reports, Japan, as a rule, annually imports fertilizers to the value of £8,000,000, oil-cake from China and artificial manures being taken in about equal proportions. Last year, however, owing to the extraordinarily low prices of oil-cake from China, the balance was much disturbed. Out of a total value of £9,000,000, Japan took about £7,000,000 of Chinese oil-cake, and only £2,000,000 of artificial manure. The increased weight of fertilizing material used in 1908 must, therefore, have been very large, and should tend to permanently improve the demand throughout Japan, either of oil-cake, when low in price, or of chemical manures, when the quotations for their rival runs too high.

Messrs. J. Russell Grant and Co. report that the market for Malay and Ceylon Rubber Company shares continues active, and that during the week ending March 4th some fair trade passed, especially in some of the lesser known companies, which are rapidly coming into request, and general trading is very good. Stocks in various companies are very difficult to procure, even at enhanced prices.

Up to March 11th the market for Malay and Ceylon Rubber Company shares had been very active during the week, and prices showed an upward tendency in several cases, and sharp rises were noted. Generally the volume of business passing has been very considerable, and mostly for investment.

The Cult of the Coco-nut.[1]

ACCORDING to Mr. Herbert S. Walker, of the Chemical Laboratory, Manila, writing in the *Philippine Journal of Science*,[2] coco-nuts from San Ramon[3] showed on analysis that they contained nitrogen, potash, and phosphoric acid in approximately the following amounts in grammes :—

	Nitrogen.	Potash.	Phosphoric Acid.
Husk	1·609	3·915	0·017
Shell	0·660	0·947	0·459
Meat	4·683	2·475	1·740
Milk	1·542	1·313	0171
Total ..	8·494	8·650	2·387

(1 lb. = 454 grammes.)

In a hectare (2½ acres) on which, at seventy-five trees to the acre, 175 should be growing and producing, Mr. Walker claims, a total of about 7,000 nuts, or forty nuts per tree, may be expected. For San Ramon this is considered a very high average, but for the sake of comparison it will serve the purpose. On the basis, therefore, of the analyses given above, the nuts, per hectare, would exhaust the following weight of plant-food from the soil. Add to this the average loss withdrawn by the leaves, *i.e.*, sixteen leaves per tree at 3 kilos each = 8,300 kilos (total weight), and we arrive at the following :—

ANNUAL LOSS.	Nitrogen.	Potash.	Phosphoric Acid.
Nuts, per hectare ..	59·43	60·55	16·73 kilos.
Leaves ,, ..	31·69	74·82	24·65 ,,
Combined loss ..	91·12	135·37	41·38 ,,

Were it not, therefore, that the root mass of a coco-nut draws nutriment from a depth of at least 2 mètres below the surface of the ground, and outward on all sides for from 3½ to 6½ mètres distance from its base, the trees would be unable to find sufficient nourishment on the poor soils which are found, as a rule, on the sea-beach at San Ramon, Trinidad, West Indies, &c., where the tree flourishes.

"It seems," adds Mr. Walker, "very probable in San Ramon at least, if not in most plantations along the sea-coast, that the nutritive material comes, not from the soil in which the trees are actually growing, but from an inexhaustible supply of water, laden with plant food, which is constantly sweeping down from the higher ground toward the ocean. The underground water supply would account for the flourishing condition of trees in a sandy soil near the sea, even in times of drought, when individuals further inland in higher and less permeable ground would be dying from want of water.

In the case of the loss owing to permeable soils, artificial irrigation during the dry season seems to be of the utmost importance, and any addition to the fertility of the land, either in the form of manure or of a chemical fertilizer, would probably be repaid by an increased yield of fruit.

Analytical research showed a gradual increase in the proportion of meat, copra, oil, with a corresponding decrease in the percentage of milk, indicating that the meat becomes firmer, and loses water as the nut increases in age, but *gains in oil*. With some nuts which had been kept for six months the meat remained the same as regards total weight, but there was a marked drop in the proportion of copra and oil, probably due to decomposition or other changes in the meat. Both in very fresh and in over-ripe nuts there is a considerable deficiency in oil, but the principal loss is in the amount of copra to be obtained, due to the higher percentage of water as compared with the solid matter in the meat. In all the nuts the proportion of shell to the whole nut varied but little.

Whilst there are individual variations among nuts from the same tree, analyses made showed very conclusively the increase in the percentage of copra and oil as the fruit becomes riper. The average percentages of copra and oil, for example, in the nut free from husk in the green fruit, are only 11·5 and 7·5 respectively, but they rise to 21 and 13·6 in the "fairly ripe" and assume a maximum of 23·4 and 15·5 in those which had been allowed to completely ripen whilst on the tree.[4] The proportion of husk taken from the seashore nuts (41·8 per cent) is much larger than it is from those gathered in the interior (32 per cent.), but this is compensated for by the fact that the percentage of milk in the nut, free from husk, and of water in the fresh meat is considerably lower in the former than in the latter. Therefore, it appears to be very evident that the superiority of trees growing near the sea is solely due to the quantity, and not the quality, of nuts they produce. This is shown by the following particulars of 1,000 nuts procured from trees growing near the seashore, and the same number from those standing in the interior. The nuts were kept for a month before being touched.

	SEASHORE NUTS.		INLAND NUTS.	
	Kilos.	%	Kilos.	%
Weight of 1,000 nuts ..	2·363	100·0	2·286	100·0
,, husks ..	·897	38·0	·703	30·8
Nuts, minus husks ..	1·466	62·0	1·582	69·2
Meat and shell	·929	—	·979	—
Milk	·537	22·7	·603	26·4
Shell (dry)	·282	11·9	·291	12·7
Meat	·647	27·4	‘688	30·1

	SEASHORE NUTS.				INLAND NUTS.			
	Sun dried.		Grill dried.		Sun dried.		Grill dried.	
	Kilos.	%	Kilos.	%	Kilos.	%	Kilos.	%
Copra	302	12·8	330	14·0	322	14·1	333	14·6
Oil	182	27·7	198	8·4	191	8·4	189	8·3
Moisture in copra	—	9·2	—	8·6	—	9·8	—	10·1
Oil	—	60·3	—	60·2	—	59·2	—	57·0

In conclusion, it is claimed that "the great porosity of soils near the sea, coupled with the fact that they are, as a rule, practically saturated with water at a distance of only a few feet below the surface of the ground, is the principal reason why they are more suitable for trees like the coco-nut, which require an enormous quantity of water for their growth. Chemically, there is very little difference in soils near the seashore than those inland ; if anything the latter (in the Philippines) is a little more fertile. The salt water from the sea has no influence on trees in its vicinity, as only amounts of chlorine so small as to be negligible were found to be present even at the bases of the coco-nut trees which were actually growing on the beach."

[1] Former articles on Coco-nut culture appeared in our issues of August and September, 1907. February, April (Samoa), and May, 1908, January, 1909.

[2] January, 1906.

[3] San Ramon Government Farm, on the West Coast of Mindanao, Philippine Isles.

[4] Full explanations of the reasons for this, with carefully prepared tables of the analyses made (fourteen tables in all) are given ; see *Philippine Journal of Science*, January, 1906, pp. 58 to 82.

Cotton.

The following were the prices for Cotton in London on March 11th, according to Messrs. Slann and Davies:—

	Good Fair.	Good.	Fine.	Superfine.	Good 1908.	Good 1907.	Compare
	d. d.	d. d.	d. d.	d.	d. d.	d. d.	
Surat kinds* ...	$4\frac{1}{16}$ to $4\frac{7}{16}$	$4\frac{5}{16}$ to $4\frac{11}{16}$	$4\frac{9}{16}$ to $4\frac{15}{16}$	—	$4\frac{9}{16}$ to $5\frac{5}{16}$	$4\frac{7}{16}$ to $5\frac{5}{16}$	per lb.
Madras	$4\frac{7}{16}$ to $4\frac{5}{8}$	$4\frac{1}{16}$ to $4\frac{7}{8}$	—	—	$4\frac{1}{16}$ to $5\frac{3}{16}$	$4\frac{7}{8}$ to $5\frac{7}{16}$	—
Bengal	$3\frac{7}{16}$	$3\frac{11}{16}$	$3\frac{15}{16}$	$4\frac{1}{16}$	$3\frac{5}{8}$	$3\frac{5}{8}$	—
Assam ...	—	$4\frac{3}{8}$	$6\frac{1}{4}$	$6\frac{3}{4}$	$4\frac{3}{4}$	$5\frac{1}{4}$	—
China	—	$4\frac{5}{8}$	$5\frac{1}{4}$	$5\frac{3}{4}$	$4\frac{5}{8}$	$5\frac{1}{8}$	—
West Indian ...	$4\frac{5}{8}$	$5\frac{1}{8}$	$5\frac{5}{8}$	$5\frac{7}{8}$	$7\frac{1}{4}$	7	—
Sea Island ...	6	8	12	14	11	$11\frac{1}{2}$	—
Australia	$5\frac{5}{8}$	6	—	—	$7\frac{1}{4}$	$6\frac{7}{8}$	—

* Liverpool quotations.

The drought in Texas has been broken by rains at last, although the precipitation is as yet only moderate; otherwise there is little to record. Trading generally during the week has been very quiet, but considering the small demand for Spot Cotton in Liverpool, values keep remarkably steady. Middling Spot is now 5·09d., 5 points lower than a week ago, and "Futures," after moderate fluctuations, close some points lower. Manchester business is, on the whole, rather better, but there are complaints still in many quarters. East Indian still tends upwards, but the prices asked make business extremely difficult.

The import into Liverpool this week amounts to 93,791 bales; since September 1st, 3,294,835; same week last year, 70,000; last year's total, 2,905,870 bales. The estimated Sales amount to 44,000 bales. Middling American is quoted at 5·09d. per lb.; last year, 6·09d.; 1907, 6d.

The latest quotations of Americans for delivery bases, middling, any port, G.O.C., were:—

	March 11th.	Last Week.	Last Year.
	d.	d.	d.
March	$5{\cdot}00\frac{1}{2}$	5·06	$5{\cdot}66\frac{1}{2}$
March—April	$5{\cdot}00\frac{1}{2}$	5·06	$5{\cdot}60\frac{1}{2}$
April—May	$5{\cdot}00\frac{1}{2}$	$5{\cdot}06\frac{1}{2}$	5·67

Movement of American Cotton since September 1st:—

	1908-9.	1907-8.	1906-7.
Brought into sight	11,291,000	9,337,000	11,205,000
Exports from United States since September 1st—			
To Great Britain	2,895,000	2,501,000	2,974,000
To Continent, &c.	3,532,000	3,265,000	3,376,000
Total crop	—	11,571,966	13,510,982

Coffee.

By Messrs. C. M. and C. Woodhouse.

Since the date of our last report the market has remained without quotable change. East Indias were in rather smaller supply and steady prices were realized, except for Naidoobatums, which were of undesirable quality and were nearly all bought in. Guatemala was occasionally easier, but other Central American kinds and Colombian were about steady. According to Messrs. Düüring and Zoon's report the stocks in the principal ports of Europe on March 1st were 8,572,000 bags against 9,564,000 bags, and 6,693,000 in 1908 and 1907 respectively; this is an increase for the month of 53,000 bags against a decrease of 88,000 bags at the same time last year. The visible supplies at the same date show a decrease for the month of 485,000 bags against a decrease of 270,000 bags in 1908, the totals being as follows, viz.: 14,894,000 bags on 1st March, 1909; 16,060,000 bags in 1908, and 15,301,000 bags in 1907. The market for "futures" has been a declining one, and after a fair business closes at 32s. $1\frac{1}{2}$d. per cwt. for May Santos against 33s. 9d. on 4th inst. We quote:—

		1909. To-day.	March 4th.
London ..	Santos, May dely.	32s. $1\frac{1}{2}$d.	33s. 9d.
New York ..	No. 7 Rio ,,	6·70 cents	6·90 cents.
Hamburg ..	Santos ,,	34 pf.	$34\frac{1}{2}$ pf.
Havre ..	Santos ,,	44 francs	$44\frac{1}{2}$ francs.

The receipts at Rio and Santos from July 1st, 1908, to March 10th, 1909, were 11,345,000 bags, against 8,750,000 bags and 15,300,000 bags in the two previous seasons respectively.

The stocks in the principal ports of Europe on March 1st were estimated at:—

1909.	1908.	1907.
8,572,000	9,564,000	6,695,000 bags.

Sales include the following, viz.:—

East India.—2,800 bags, viz.: Mysore—46s. 6d. to 53s. for ordinary to fair, and 65s. for fine smalls, 52s. to 61s. 6d. for low middling to good middling, 68s. 6d. for fine middling, 56s. to 67s. for middling to good middling bold, 73s. 6d. to 92s. 6d. for good to fine bold. Coorg—51s. for smalls, 53s. to 55s. 6d. for middling to good middling, 58s. 6d. to 66s. for good middling bold. Neilgherry, &c.—48s. 6d. to 49s. for smalls, 55s. 6d. to 61s. for middling to good middling, 62s. 6d. to 70s. for good middling bold. Naidoobatum—45s. to 47s. for smalls, 55s. for middling.

Jamaica.—140 barrels and bags, at 52s. 6d. for smalls, 47s. to 54s. for fine fine ordinary to low middling, 52s. 6d. to 62s. for fine fine ordinary to low middling bold.

Costa Rica.—145 bags, at 46s. for smalls, 70s. to 71s. for fine middling, 75s. to 81s. for fine bold.

Guatemala.—2,650 bags, at 46s. to 49s. for smalls, 57s. to 58s. 6d. for low middling to good middling, 55s. to 66s. for middling to good bold, 90s. 6d. to 92s. for Maragogipe.

Sugar.

Mr. C. Czarnikow, writing on March 11th, reported that the moderate receipts of 58,000 tons in Cuba, backed up by a rise in New York from 3·71 to 3·86 cents, equal to 7½d. per cwt., had temporarily stimulated our market to the extent of 1½d. per cwt., especially as the river navigation apparently will not be open for some time yet. Even the Baltic is closed, and consumers need sugars both for immediate wants and partly also before the publication of the Budget. The risk of an increase in sugar duties is not rated very high yet, but traders will try to put in some stocks now, even with the chance of a dragging trade later on. France is consigning sugar here for the same purpose, though it involves a sacrifice on present prices in Paris. With more Americans and Russians coming in, we therefore expect full deliveries for March, though they may not be a true guide to actual consumption.

On the other hand, German and Austrian export figures in February are not favourable. The German exports were only 49,000 against 79,000 tons, Austrian (excluding Hungary) 23,000 against 47,000 tons, and even if Hungary should have exported similar to January, viz., 26,000 against 18,000 tons, that would give a total of only 98,000 against 145,000 tons disappeared from stocks, against which United Kingdom stocks decreased 23,000 against 12,500 tons, and the Hamburg store 2,000 tons, instead of increasing 16,000 tons. Austria consumed same as last February, but produced 11,580 against 10,906 tons, which is decidedly more than expected. United Kingdom imported of Russian 3,800 tons (probably 5,000 tons), from America 4,600 tons, and from Convention countries only 71,100 against 81,700 tons, which difference of 10,600 tons, plus the Hamburg difference of 18,000 tons, would reduce to 20,000 tons the above deficiency of 47,000 tons in European exports; therefore our shipments elsewhere of Convention sugars should be 60,000 against 80,000 tons, provided other countries show no variation. This might have been worse, but India continues taking Mediterranean sugars, and some Baltics are reported for Argentine.

Revised estimates from India show that a few minor provinces have not sent in returns yet, but it seems that on 83 per cent. of the usual Indian sugar area there is a crop deficiency of only 12½ per cent., though the acreage is 20 per cent. less, the yield in the Punjab and United Provinces being comparatively good, whilst Bengal compares badly owing to last year's high figure. It would, of course, be erroneous to suppose that the entire deficiency has to be covered by imports, but India received in October—December 23,000 against 5,000 tons beet, 183,000 against 162,000 tons cane, and may go on importing more for some time yet, though not excessive quantities. Consumption in the East often rises and falls with home crops, and with cheap or dear prices.

Regarding Cuba, the weekly receipts are disappointing, and it may be that the rain hindered some factories, whilst great complaints are made about want of railway transport. That, however, happens every year with large crops, and the railways have managed 63,000 to 65,000 tons in previous weeks, if the figures really were correct. But when taking the total of all ports in January—February the figures are fairly good, and of great interest as regards outports alone. The crop began later than in 1907, but in February the outports seem to have turned out 100,000 against 66,000 tons in the big year. If this continues, the six port figures lose considerably in interest as a guide to production. The outports can easily do more than the 385,000 tons allotted to them if there should be sufficient cane, about which a few complaints are heard in some quarters, and, as to the six ports, it becomes a question how long factories will work. One has finished, and one or two more will probably finish this week, same as two years ago. In that year we had three more weekly receipts of about 60,000 tons, four of about 37,000 tons, and two of 25,000 tons. During those nine weeks we can afford this year to have 7,000 tons less each week, and yet finish with a crop of 1,300,000 tons. We might not have been alarmed about a few thousand tons less this week had it not been for the American rise, which makes everybody believe that America should know more about Cuba than we do, and that the rise is a clear expression of American estimates. But at the end of February 46 per cent. of the crop was made already, same as before, and prices had been too low. Usually there is more resisting power when half the crop is made, and, as long as Europe remains at about 10s. 6d. for August 88 per cent. f.o.b. Hamburg, America will have to rise still more, in order to compete, not for beet, but for the Javas she wants.

The New York market opened firm with a gradual advance to 3·86 cents, then receded to 3·81½, which was followed by a recovery to 3·83½, but closed last night at 3·80 cents for centrifugals = 9s. 9¾d. c.i.f. for 96 per cent. = 8s. 9¾d. f.o.b. Hamburg for 88 per cent. Business during the week has been fairly active, but sellers at the higher level became more pressing, causing buyers to show less eagerness, as the general outlook for the Cuban crop is still considered favourable, notwithstanding the receipts being smaller than expected. Besides, the action of the Tariff Commission is still uncertain, and induces caution on the part of the trading community.

There has been a better demand in the United Kingdom for refining grades of cane sugar, which resulted in an advance of 1½d. to 3d. per cwt. for sugars on the spot, while distant arrivals do not attract much attention. For this reason we leave our quotations for floating cargoes unchanged. The lower and medium grades of grocery descriptions, too, have improved in value, but good and fine have still a slow sale.

As to cane-producing countries, the chief interest is centred in Cuba, to which we have referred above; the latest cable received speaks of spring-like weather, and, should general rains not set in too early, more than 1,300,000 tons may be produced. The advices from the British West Indies are only moderately favourable, and a good yield is hardly to be expected. From Java the accounts continue satisfactory. In Louisiana, notwithstanding heavy rains and cold weather at the end of February, indications are in favour of a good start in the canefields.

The total transactions in British West Indian for the week amount to about 7,500 bags. Crystallized Demerara, low middling yellow to middling palish yellow, 14s. 6d. to 14s. 10½d. duty paid; good middling palish, 15s. 1½d.; fine palish, 15s. 10½d. to 16s. 9d.; syrups, low middling yellow, 13s. 3d.; middling soft yellow, 13s. 6d. to 13s. 9d. Crystallized St. Lucia, good middling yellow, 15s.

Crystallized Surinam sold, low middling yellow to middling palish yellow, 14s. 9d. to 14s. 10½d. duty paid.

The India-rubber Market.

By Messrs. S. Figgis and Co.

The end of February saw a few sales made at an advance (established early in the week), fine hard selling up to 5s. 3¾d., soft 5s. 2¾d., ball 3s. 7½d., but the market closed flat at 1d. decline, except soft, which continues scarce, selling at 5s. 2d. Some Caucho ball sold down to 3s. 6½d.

At the auctions on February 26th *Plantation Malay* sold as follows: Sheet, good to fine pale, 5s. 4½d. to 5s. 5½d. Crêpe, good to very fine pale, 5s. 6d. to 5s. 7d.; fair to good palish, 5s. 4¾d. to 5s. 5½d.; light brown and grey, 5s. 1¾d. to 5s. 4¼d.; clean dark brown, 4s. 11¾d. to 5s. 1d.; dark and specky, 4s. 7d. to 4s. 11d.

Ceylon realised: Sheet and biscuit, fair to good pale, 5s. 5d. to 5s. 5½d., and two lots of very fine pale, 5s. 9¼d. to 5s. 9¾d.; fine pale crêpe, 5s. 6½d. to 5s. 7d.; fair to good palish, 5s. 4½d. to 5s. 5d.; clean brown, 5s. 2¼d. to 5s. 3d.; dark brown, 5s. to 5s. 1¾d.; dark and specky, 4s. 6d. to 4s. 10d. Scrap, fair to fine, 4s. 6¾d. to 4s. 7¾d.

During the next week (ending March 5th) the market was very quiet, with an easier tendency, with fine hard at 5s. 2½d.; soft fine, 5s. 1¾d. to 5s. 2d.

Prices declined nearly 1d. during the week ending March 12th, and with pressure from Pará to sell soft; private business included:—

Fine Hard.—Business down to 5s. 1¾d. Peruvian, 5s. 1½d. near and forward, closing at 5s. 2½d.

Fine Soft.—Sold freely down to 5s. 1d., closing at 5s. 1½d. sellers.

Negrohead.—Scrappy, about 4s.; Cameta, 2s. 9d.; Island, abundant, down to 2s. 5d.

Caucho Ball down to 3s. 5d., and to-day 3s. 5½d. closing buyers, but in the auction on the 12th there was a good competition for Plantation, and prices on the average were nearly up to last sales, as follows:—

Plantation Malay.—Sheet, good to fine pale, 5s. 4d. to 5s. 5d.; rough and immature, 4s. 8¼d. to 5s. 3d. Crêpe, good to very fine pale, 5s. 5d. to 5s. 6½d.; fair to good palish, 5s. 3½d. to 5s. 4¾d.; light brown and grey, 5s. 1¾d. to 5s. 3¼d.; clean dark brown, 4s. 11¾d. to 5s. 1¾d.; dark and specky, 4s. 10d. to 4s. 11¼d.; block softish, 4s. 4d. to 4s. 7d. Good Lanadron retired. Scrap, fair to fine, 4s. 4¼d. to 4s. 7¾d. Rambong, fine clean red crêpe, 5s.; darker, part pressed, 3s. 4d. to 4s. 6½d.

Ceylon.—Sheet and biscuit, fair to good pale, 5s. 4¼d. to 5s. 4½d.; fine pale, 5s. 5d. to 5s. 5¾d. Worms, good to fine pale, 5s. 5d. to 5s. 6d.; fair palish, 5s. 3¾d. Crêpe, fair to good palish, 5s. 2¾d. to 5s. 5¼d.; clean brown, 5s. 0¾d. to 5s. 2½d.; dark brown and specky, 4s. 8¾d. to 4s. 11¾d. Scrap, fair to fine, 4s. 4d. to 4s. 8d.

Uganda Plantation.—Fine smoked sheet, 5s. 2¼d. to 5s. 2½d.; rough lumps, 3s. 6d.

Pará rubber statistics for the month of February (tons):—

	Pará.	Caucho.	1909.		1908.	1907.	1906.
Receipts at Pará ..	3,800	1,240	= 5,040	agst	5,340	5,060	3,920
Shipments to Europe	1,390	680	= 2,070	,,	3,750	2,870	2,850
,, America	2,000	470	= 2,470	,,	1,960	2,740	2,050

Crop statistics, June 30th, 1908, to February 28th, 1909:—

		Pará.	Caucho.	1908-09.	1907-08	1906-07.	1905-06.
Pará Receipts	1908-09	22,160	4,120	26,280	24,440	23,560	24,320
	1907-08	20,670	3,770				
,, Shipts.,	Europe	9,150	2,730	11,880	14,390	10,950	13,645
,, ,,	America	11,910	1,180	13,090	9,140	12,260	9,965

Tea.

By Messrs. Wm. Jas. and Hy. Thompson.

The total offerings this week, ending March 11th, have been in all some 61,767 packages compared with 77,570 packages last week. Notwithstanding this material reduction in supply, the general tone of the market has not responded, and although the best of both Indian and Ceylon have fairly maintained their late values, ordinary medium and common tea has been easier to buy, though nominally the quotation remains the same.

The Board of Trade returns for February show expansion in both home consumption and re-exports, which, coupled with a shortage in imports of nearly a million lb., have made their mark upon stocks, which show, on the month, a decrease of over 5,500,000 lb.

With Indian tea, the quantity brought forward this week was somewhat less: 36,435 packages against 35,249 packages a year ago, the total for the season to date (including South Indian teas since August 1st) being 1,220,294 packages; 1907-8, 1,129,061 packages. The tendency in the room was very much the same as last week, strong competition for all good liquoring and autumnal flavoured invoices being coupled with a quiet tone for the more ordinary descriptions below 8d. The bidding flagged somewhat on Monday, and the closing auctions were marked by a certain amount of irregularity, although no great change in prices can be quoted, except perhaps for inferior sorts and thin liquoring reddish teas which were not wanted, and ruled about ¼d. per lb. below the highest point a fortnight ago, and were if anything a trifle easier to buy on Wednesday. Fine and finest teas sold well, long prices being willingly given for bright tippy parcels, and as many of the Assam gardens are rapidly closing their crops, the quantity of this grade remaining is small. The small quantity of fine Darjeelings included in the catalogues were picked out and realized very satisfactory averages. The supply of dusts and fannings has been rather more than the Trade could conveniently handle, so that quotations are slightly easier, except for anything with stand-out liquors.

The following are the best averages made: Darjeeling—Ting Ling, 1s. 3¼d.; Dooteriah, 1s. 1¼d.; Rungmook, 11½d.; Mineral Spring, 11d. Assam—Kharjan, 1s. 1¾d.; Tara, 1s. 0¾d.; Balijan Co. and Mokalbari, 1s.; Lattakoojan and Muttrapore, 11¾d. Dooars—Hantapara, 10¼d; Lankapara, 9½d.; Nagaisurie, 9d.

The average of the entire sale was 8¾d. against 8d. per lb. last year.

With Ceylons the sale generally passed off with a steady tone, although the high rates ruling a fortnight ago have not been maintained, and prices all round show a small decline. Commonest sorts have suffered most, especially Pekoes, which can be quoted fully ¼d. per lb. lower. The finest kinds which retain good quality sold well, but where any deterioration was evident some irregularity was noticeable and prices receded a little, a fair number of export orders, however, helped the sale for Orange Pekoes and and Pekoes between 8½d. and 9½d. Medium descriptions remain practically unchanged, but teas under 7¾d. met with less competition and were easier to buy; common dusts and fannings were not so much in demand.

The following satisfactory averages were obtained: Brookside, 11¾d.; Caledonia, Henfold, Kotiyagalla, Sutton and Udaradella, 11¼d. per lb. For the whole sale the result was 8½d. compared with 7⅝d. last year.

The London Cocoa Market.

By The Editor.

Important Decision *re* San Thomé Cacao.

The Great Firms in United Kingdom will cease to Buy it.

As a result of Mr. William A. Cadbury's journey to San Thomé and Principé, in company with Mr. Joseph Burtt, the firms of Messrs. Cadbury Bros., Ltd., S. Fry and Sons, Ltd., and Rowntree and Co., Ltd. (and I take it the large German and American firms whom the English makers have all along claimed were working with them in the matter), have decided not to make any further purchases of the cocoa produced in the Islands of San Thomé and Principé. They will be prepared, however, to reconsider their decision when they are satisfied that such reforms have been carried out so as to secure the Angola labourers freedom of contract.

The London *Daily News* (owned by Mr. George Cadbury) in their leader on the subject, congratulated the firms on their decision. "The planters," they say, "have been proof against all appeals to humanity; we shall see whether they cannot be reached through the pocket."

In a column-long article in the same paper (*Daily News*, March 17th), Mr. Nevinson states in conclusion: "The Co-operative Society declared the boycott last week, the three greatest English firms declare it to-day. Some foreign firms have declared it (names not given); others will be forced to follow."

So war has at last been declared against slave-grown cocoa. Defenders of the Portuguese system say that the trade cannot do without it, that they will always get all the buyers they want. The other side insists that once the Portuguese see the English makers are in earnest, that they will give way at once. Meanwhile it is good to note that the makers "will be prepared to reconsider their decision" if the reforms asked for are adopted. If the boycott is an international one, as stated by Mr. Nevinson, the decision arrived at should improve the demand for West Indian, West Coast of Africa, and especially for Bahia cocoas.

Our Board of Trade returns to the end of February show, I am glad to say, a very marked increase in the deliveries for home consumption over both 1908 and 1907. Referring to last month's issue I see that want of space caused the January figures to be cut out, so I will just give them here together with those for France and Germany for comparison:—

January only—	1909.	1908.	1907.	
U.K. (deld. for consumption) ..	2,511	2,417	1,563	tons
France ,, ,, ,, ..	1,638	1,405	2,050	,,
Germany ,, ,, ,, ..	2,529	1,784	2,173	,,

For January, therefore, the United Kingdom showed 94 tons increase, by the end of February this had been increased to 949 tons, say:—

Raw Cocoa—	Landed.	Deld. H.C.	Exported.	Stock, Feb. 28.
Jan.-Feb., 1907—	4,940	3,045	890	3,230 tons
,, ,, 1908—	7,088	3,573	988	5,234 ,,
,, ,, 1909—	9,240	4,522	1,095	8,920 ,,
Increases	2,161	949	107 tons	

All the above "consumption" returns are, of course, only for the raw cocoa delivered to the manufacturer to use, and, as Messrs. Hogins and Lee pointed out with respect to the American deliveries during last year and 1907, no one can really say how the last three years really stood as regards the actual consumption by the public of the manufactured article. So long as England and Germany continue to show such splendid increases in their requirements, the planter need not, and will not, trouble how the eating consumption compares with the previous three years. The quantities of cocoa bought and taken delivery of by Germany since the end of October, and especially during December and January, certainly cannot be expected to continue. It is surprising that she was able to take so much. Manufacturers' invisible stocks must have been very low a year ago.

Meanwhile the keen competition from all parts of the consuming world to secure large parcels of cocoa whilst supplies were ample has caused prices not only to be maintained but to rule in some cases higher than those shown in the concluding paragraph of my last month's report. At the time of writing Bahias especially are ruling high in sellers', if not buyers', estimation, and are spoken of as not being easily obtainable, for buyers of superior are anxious to secure parcels at that price. At the same time the sales of March 9th are going on, and there seems less competition, with some tendency for lower prices for medium and ordinary West Indian. On the other hand, good to fine bright cocoas, above all Grenadas, seem going as well as ever, and that is certain to keep the general tone of the market steady.

Whilst waiting for the sales to finish I will turn to the mail letters just to hand. The price of Guayaquil at the port of shipment gives no signs of going lower, and telegraphic news shows that sellers' ideas remain very firm in spite of heavy receipts. These to the middle of March work out as follows. Whilst about it, I will give the other receipts as well:—

	1909.	1908.	1907.	
Guayaquil receipts, Jan. 1-Mar. 15	—	—	—	qtls.
Lisbon receipts (San Thomé), Jan.-Feb.	107,500	114,000	99,300	bgs.
Bahia exports, Jan. only	60,976	26,500	34,000	,,
	1908-9.	1907-8.	1906-7.	
Trinidad Shipts., Oct.-Feb.	125,500	118,455	44,640	,,
Grenada ,, Oct.- ,, ...	34,827	38,051	36,253	,,

Whether the 1908-9 Grenada crop will prove a record it is too early to say. Last year's output did not exceed either that of 1907-8 or 1906-7, although individual estates in the Island did better than they had ever done before. The January-February pickings throughout the island this year seem to have been very good, and both in Trinidad and Grenada plenty of rain has fallen lately, so the ground should keep moist against any drought that this month or April may bring along.

Last month San Thomé was not selling so freely in proportion to Bahias and the best Grenadas. Heavy purchases from Hamburg, America, and also from this side, have considerably reduced the stock at Lisbon, which at the end of February stood at 116,000 bags.

In mid-February it was 110,000 bags, against 154,853 last year, and 125,500 in 1907. The tendency at the moment for the best qualities of all these medium cocoas is very firm.

According to the last business done, including the sales on March 9th, values run as follows:—

Trinidads.—Superior (nominal), 64s. to 67s. ("La Compensacion" mark is valued at 67s.); good middling to fine, 60s. to 63s.

Grenadas.—Good to fine marks sold at 57s. to 59s. 6d.; good fair to good red, 54s. to 56s.; ordinary unfermented to fair fermented, 52s. to 54s.

Jamaicas are mostly of dull fermented appearance, selling at 51s. to 54s. for fair to good fermented, and therefore are not doing so well in proportion. Superior

Jamaica, as reported last month, realized 60s. in mid-February, against 59s. 6d. for the best Grenadas, so they must be worth the same price or a shade higher to-day.

St. Lucias.—Good to fine marks sold at 55s. 6d. to 58s. 6d.; fair to good fair fermented, 51s. 6d. to 54s.

Dominicas.—Ordinary quality of this and other West Indian kinds are more difficult to sell than the fine bright fermented. The best lots sold up to 55s. 6d., ordinary unfermented to fair 50s. to 52s. 6d.

Costa Rica.—Ordinary reddish, 50s. 6d. to 51s.; good reddish fermented, 54s. 6d.

San Thomé.—Fine has been selling at 57s.

Bahia.—Superior sold at 59s. 6d.; fair is valued at 57s.

Demerara.—Fine sold at 60s.

West Coast Africa.—Good bright has been selling up to 55s.; ordinary washed down to 47s.; up at Liverpool very large sales have been made at 46s. to 54s I notice that 13,000 bags of Accra went into Havre during February. Liverpool, during January and February, delivered 83,603 bags of all growths, so has had a busy couple of months.

Java.—Fine realized 80s., medium 68s. to 76s., smaller 67s. 6d.

Guayaquil.—Arriba has been selling at 74s. to 75s.; Tumaco, 57s. to 58s.; Caraquez, 63s. 6d. to 64s.; Machala is valued at Caraquez rates, but no sales have taken place of late.

Ceylon.—Fine lots have been selling up to 81s.; fair to good medium and bold, 66s. to 74s.; "Native" at 50s. for fair, and 59s. to 61s. for good even bold.

Samoa.—Fine sold at 80s. 6d. and 81s.

Havre stocks and values ran as follows on February 28th:—

	1909.	Value. Fcs.	1908.	Value. Fcs.
Pará ..	7,730	72 to 75	4,522	97 to 105
Bahia ..	16,983	69 ,, 74	13,863	87 ,, 97
Venezuela ..	16,830	69 ,, 140	16,665	95 ,, 160
Trinidad ..	20,092	72 ,, 76	19,861	92 ,, 97
Other W.I. ..	7,033	62 ,, 69	5,810	84 ,, 92
San Thomé ..	6,957	69 ,, 72	1,685	86 ,, 95
San Domingo	21,990	60 ,, 65	3,360	78 ,, 84
Haiti ..	9,857	53 ,, 66	10,035	74 ,, 87
Accra ..	16,288	61 ,, 63	5,587	81 ,, 83
Guayaquil, &c.	26,015	G'l 74 ,, 85	16,384	G'l 109 ,, 125
Total	151,745 bags.		97,772 bags.	

Stocks in London on March 16th were:—

	1909.	1908.
Trinidads	12,582	15,038 bags.
Grenadas	13,093	15,585 ,,
Other W.I.	4,369	3,423 ,,
Ceylons and Javas ..	17,077	14,427 ,,
Guayaquils	16,425	6,132 ,,
Brazils and Bahias ..	998	969 ,,
Africans	22,267	9,456 ,,
Other foreign	7,527	6,211 ,,
Total	94,338	71,241 bags.

At the sales on March 6th prices of what sold showed no appreciable change, but the tone is quieter, and there is a tendency for prices to move rather in buyers' favour.

A COOMASSIE subscriber writes: "I shall be glad if you can recommend me a cheap machine for making rum from sugar cane, together with full particulars. When my subscription falls due, please apply to my agents for same. Wishing you every success with your most interesting journal.—I am, &c. [Note ED. *T.L.*—We have already placed an order for this friend.]

EMIL PASSBURG, BERLIN,
Manufacturing Engineer.

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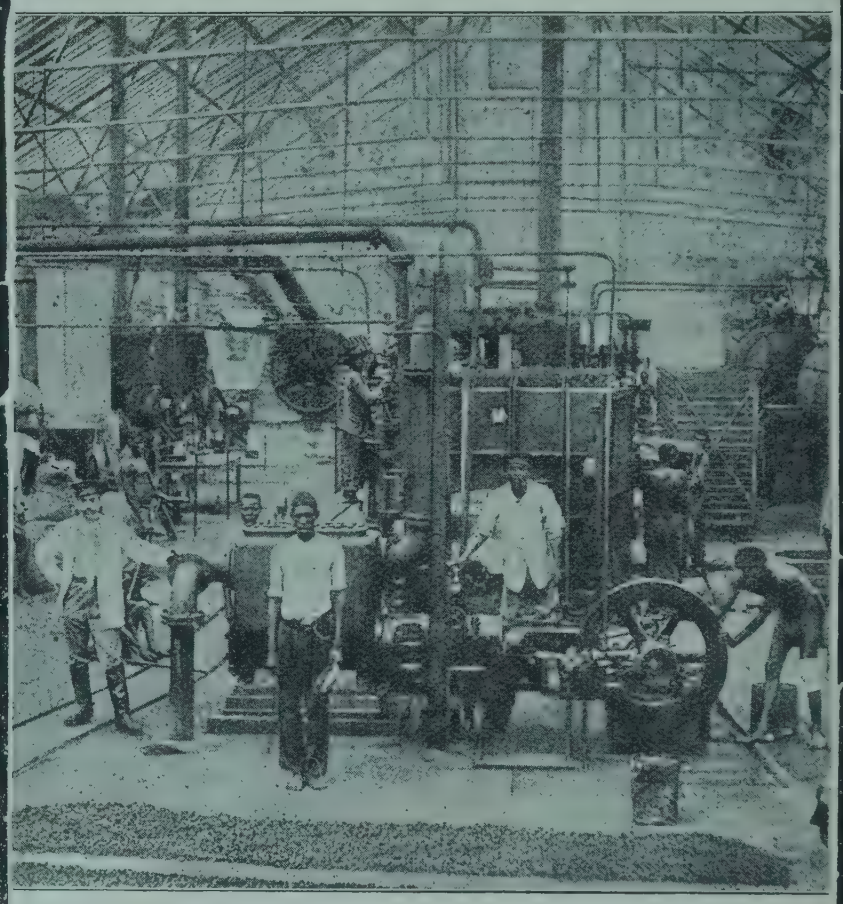

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Tropical Life:

A Monthly Journal devoted to the Interests of those living, trading, holding property, or otherwise interested in Tropical and Sub-Tropical Countries.

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The Fermentation of Cacao.

PROPOSED PRIZE FUND TO ENCOURAGE FURTHER RESEARCH WORK.

DURING the last twenty years several improvements have been introduced in the systems and methods employed to dry cacao, but as regards the fermentation planters still have much to learn. German and Dutch authorities have published accounts of their investigations in this line, and have added to the scientific knowledge of the subject. What we now require is to have a popular scientific treatise drawn up in English on the fermentation and drying of cacao; one that will fully explain the why, when, and where of the biological and other changes that take place in the beans. Such a treatise will, we consider, encourage the planters to continue the experiments on a large scale, and by adapting the method found to give the best results they will be able to assure an improvement in the quality, colour, appearance, and more even break of their beans. It should also enable small peasant and other proprietors, as in the West Indies, to turn out from numberless small plantations large bulked shipments of cacao, as similar in appearance as is the case with the exports from Bahia, San Thomé, the Gold Coast, &c., cacao that can be depended upon to turn out to type, and not show a marked difference in appearance in every few bags.

In order, therefore, to encourage further research work on the lines stated, and to ascertain exactly what changes (together with their causes, and whether these changes occur during the fermenting process only, or whilst being dried) take place in the cacao bean between the time that it leaves the pods until it is shovelled into the bag for export, the Editor of TROPICAL LIFE has much pleasure in heading a list of donors of £5 each towards a prize fund for the best treatise on the subject, the said treatise to be competed for on terms as shall be agreed upon by the various subscribers as soon as the list is closed.

It is hoped to raise at least £50. Whether one or more prizes will be awarded depends on the decision of the subscribers and the amount raised. At present three promises have been received, and two more from the Continent seem likely to follow. Those already subscribing include:—

The Editor of TROPICAL LIFE.
Messrs. Cadbury Bros.
Die Indische Mercuur.

ACCORDING to the Florida agricultural experts there is about three times as much nitrogen in the soils as there is in the subsoils; slightly more than three times as much in the subsoils as in the second subsoils; and nearly one and a half times as much in the cultivated soils as in the virgin soils.

THE MONTH'S GOSSIP.

Rice and Beri-beri.

According to the supplementary report of the Wellcome Research Laboratory, Khartoum, Holst and Frölich term "ship beri-beri" the "younger brother of scurvy," but point out that it is possibly a different disease to tropical beri-beri. The theory that beri-beri is due to an intoxication by a poison conveyed in "uncured" rice originated with Braddon, author of "The Cause and Prevention of Beri-beri," so that one is inclined to come to the conclusion that rice does play a part in the production of the disease, until further experiments prove otherwise. Fletcher, as a result of his research work at Kuala Lumpur, in his notes on "Rice and Beri-beri," concludes that "uncured rice is, either directly or indirectly, a cause of beri-beri, the actual cause being (1) a poison contained in the rice; (2) deficiency of proteid matter, the disease being due to nitrogen starvation; or (3) uncured rice does not form a sufficiently nutritive diet, and renders the patient's system specially liable to invasion by a specific organism, which is the cause of beri-beri. Herzog mentions that women sick with beri-beri should not nurse children, and states that "rice should, in private practice at least, be entirely withdrawn from the daily diet of the patient."

Mouldy rice certainly should be avoided; all authorities condemn its consumption, as well they might; but boiled rice also should not be eaten after having been kept on hand. Cooked or uncooked, there is no doubt that rice may prove a dangerous food if its possibilities to work mischief are not fully realized and guarded against.

Our old friends, the Caravonica Cotton Plantations, Ltd., of Bombay, are experimenting with Sea Island cotton. If successful, this variety could, even by becoming hybridized, improve the native kinds. At present it is too early to say anything as to results, but so far the plants are healthy looking, and, should the trials prove successful, a much larger area will be planted next year. The past season has not been a favourable one, as the failure of the rains seemed to have encouraged the development of every kind of insect injurious to the growth of the plants. This year much better results are, however, looked for in all ways. Meanwhile, our friends have not failed to take advantage of their troubles, for, as all keen agriculturists should do, they have been watching the trees that bore up best under the adverse season through which they have had to pass, and have specially marked the strongest-growing ones that have apparently become thoroughly acclimatized for obtaining seed from for their customers during the coming season.

Production and Exportation of Cacao.

According to the Government reports, the cultivation of cacao in Cuba has slightly increased as regards the number of estates, but those lately added evidently have very few trees on them. For the fiscal year 1907-8, 1,137 plantations are returned with 1,960,246 trees, as compared with 745 plantations with 1,860,306 trees in 1906-7. There was, however, a diminished production of 6,023,700 lb. against 9,380,900 lb. in 1906-7, due to scarcity of rain. During the last six months of 1907, 3,286,730 lb. of cacao, valued at £95,520, were exported, over half of which went to the United States, 983,759lb. to France, 277,346 lb. to Spain, and 241,206 lb. to Germany. These reputed yields sound too heavy to be correct, especially when one remembers that the cacao is of the Criollo character, light in weight, and not too many to the pod. For 1907-8 it would work out at a little over 3 lb. dried cacao per tree planted; and for 1906-7 at over 5 lb. The actual number of trees planted must be five or six times above the quantities given, for it is most improbable that every tree is in full bearing.

Fruit-growers in Queensland draw attention to the danger of shipping fruit in second-hand cases. These, it is maintained, are a fruitful means for the propagation of diseases, and were the means, probably, of introducing the "black spot" disease into the State.

Queensland maize experts claim that most of the wedge-shaped varieties will give good yields under proper cultivation. In selecting seed corn, care should be taken to select unmixed cobs, all of the same variety. They should be selected from stalks bearing at least two cobs. No cob should be used for seed that is not well filled out at both ends; they should be from 9½ to 10½ in. in length, with at least sixteen rows of grain on the cob. No grain should be used for planting except those taken from the centre of the cob, each end for fully 2 in. being rejected.

Agriculture in Natal.

According to the Natal *Agricultural Journal*, experiments have recently been made in Arizona with a cactus (*Echinocactus wislizene*) to produce a perfect substitute for leather. It seems that after the water is pressed out from the fibre the latter possesses extraordinary strength and pliability, and when glycerine to the extent of 25 per cent. is added to the water in which the fibre is afterwards boiled, the tanning process is completed, and a "leather" results which is no wise different from the real article. The older joints of the prickly pear leaf can also be used for the same purpose.

There are several Natal firms engaged in the production of ground bone from local sources, and the class of material they offer for sale reflects much credit on their commendable enterprise in thus making use of a source of phosphates, which latter are of inestimable value to the soils of Natal. Bones are always a safe form in which to apply phosphoric acid; they represent a neutral source intermediate between the acid superphosphate and the alkali basic slag, and may be used to advantage for any crop.

The peculiar value of superphosphate is due to the amount of its water-soluble phosphoric acid, which imparts to it a ready availability. Basic slag, on the other hand, is characterized by the presence of free lime and the comparative solubility of its phosphoric acid. In raw bone dust it is less soluble than in either of these forms—slightly less so than slag—but when finely ground it constitutes by no means a slowly acting manure, and it has the advantage of containing a fair amount of nitrogen.

For crops of quick maturity superphosphate seems to be most favourable; for slower growing crops either form may be supplied with advantage.

Superphosphate and bone dust are occasionally applied together, but the mixture should be made only immediately before spreading. They should not be allowed to lie in contact with each other for any length of time if the superphosphate is to be allowed to retain its proportion of water-soluble phosphoric acid.

Notes on Present Condition of the Castilla Rubber Industry.

By Dr. Pehr Olsson-Seffer.

Part IV.

Later experience has proved that the cheapest and surest method is to plant the seeds at stake. Nearly a year's growth is thus gained, and it does away with the expensive replanting where failures occur under transplanting methods. The seeds are planted in small hills, about seven seeds in each hill, 3 in. between the seeds. The hills are at a distance of about 7 ft., in rows 12 ft. apart.

In planting in this manner we allow for a high percentage of failures in germination; we can give ants, lizards, and field rats their due amount, and we still have plants in abundance. This method has now been practised for several years with success. There are no complete failures in any hill, except where planting has been done in ground which is too acid. In such places we may have to replant in small patches after a proper draining has been prepared for, and for this purpose we use excess plants growing in the neighbourhood. During the first few months those seedlings that seem backward, misshaped, or where crowding is observed, should be thinned at the time of each weeding. Generally at least 50 per cent. of all the seedlings should be cut out during the first six months. This thinning should be continued during subsequent years, until at the end of the fifth year from sowing there are approximately 800 trees to the acre. The best 400 trees of these are to remain permanently, and are not touched before they have reached 26 in. or 28 in. in circumference at 3 ft. from the ground. The intermediate trees are tapped when five years old, very heavily; that is, as much latex as possible is extracted. A few weeks later the trees are inspected. Those that have suffered from the tapping should be marked and doomed. If they still yield latex they are cut up with numerous incisions, and a few days afterwards the scrap is collected and the trees felled. Those trees that promise to recuperate should be left untouched for four months, when they are again tapped in the regular way. After a second inspection they should be killed. Exceptional trees which do not crowd upon the permanent trees may be left to the following or sixth year, when they are tapped with an ultimate view to their destruction. At the end of the sixth year we have 400 trees to the acre.

The number of tapping tools brought out in the last few years is very large, but none seems to be more suitable for tapping *Castilla* than a modification of the common farrier's knife, supplied with an extra single blade that makes a thin paring of the incision immediately following upon the opening of the wound caused by a pulling movement with the knife. The second bit is gauged somewhat deeper than the curved front bit, and the object of this is to cut through the cambium, thus opening all the latex ducts without paring the wood bare or pulling away any part of the cambium.

An ordinary tapper is expected to cut 1,000 incisions per day; that is to say, tap 250 trees with four incisions up to a foot long. Tapping should be done between 5 and 11 a.m., better still between 5 and 9 a.m.

In tapping *Castilla* trees all the latex exudes from the wound in a time varying from twenty minutes to two hours. After that time very little latex appears. Two days after tapping all wounds should be inspected and cleaned of scrap. If an incision has been too deep, penetrating into the wood, the wound should be disinfected by the scrap collector, who for that purpose carries a brush and a can with a mixture, the application of which prevents fungi from getting a foothold. A normal wound, where the wound is still covered by cambium, heals quickly, and is not, as a rule, attacked by borers or fungi. The fluid used as a disinfectant is made from the mother liquor of the rubber, to which is added resin, oil, and copper sulphate.

As far as our present knowledge goes, the best system of tapping seems to be a modified half herring-bone. That is, *the central vertical channel must be made very shallow and not penetrate the cortical tissue*, as otherwise the bark pressure on the trunk will be diminished, and the flow of latex lessened. Further, the incision must not encircle more than half the circumference of the trunk, the second half being left undisturbed for a second tapping three or four months later, when the wounds of the first tapping are healed over, and the functions of the bark again go on normally.

The first incision should be made as low down on the trunk as is practicable. The next incision can be made 18 in. higher, and it will be found that the entire area between the wounds has been drained. Multiple tapping, with a week's interval or so, gives a comparatively small amount, and is in most instances a too severe tax on the tree. Reopening the incisions, as is done with *Hevea*, does not give any result, and is disastrous to the life of the *Castilla* tree. Tapping is generally done, however, every eight weeks.

The latex is collected from the trunk into small cups, fastened to the tree with a sling round the trunk, not attached to the trunk by being pushed into the bark. From these the latex is emptied into small galvanized cans holding $2\frac{1}{2}$ gallons each, which are used for transferring the latex to the large transport cans brought to the field on carts.[1] To prevent too rapid coagulation, which is often liable to take place in latex from young trees, even before it has arrived in the factory, a small quantity of formalin water is added.

Of modern methods of coagulation we have two essentially different types, the chemical and the mechanical.

Coagulation is effected by means of many different chemicals. I have made experiments, several hundreds in number, using different chemicals. The results vary greatly, and I cannot here go into details, but can only mention that the observations made in this connection will soon be published. So much has been established: that whatever chemical is used the resulting rubber is not of as good quality as when coagulation is effected by mechanical means. Chemically coagulated rubber is usually shorter in fibre, snaps readily when stretched, and does not last as long as mechanically prepared rubber. Sometimes it may be found necessary to use a chemical coagulant, but wherever this can be avoided we get a better rubber.

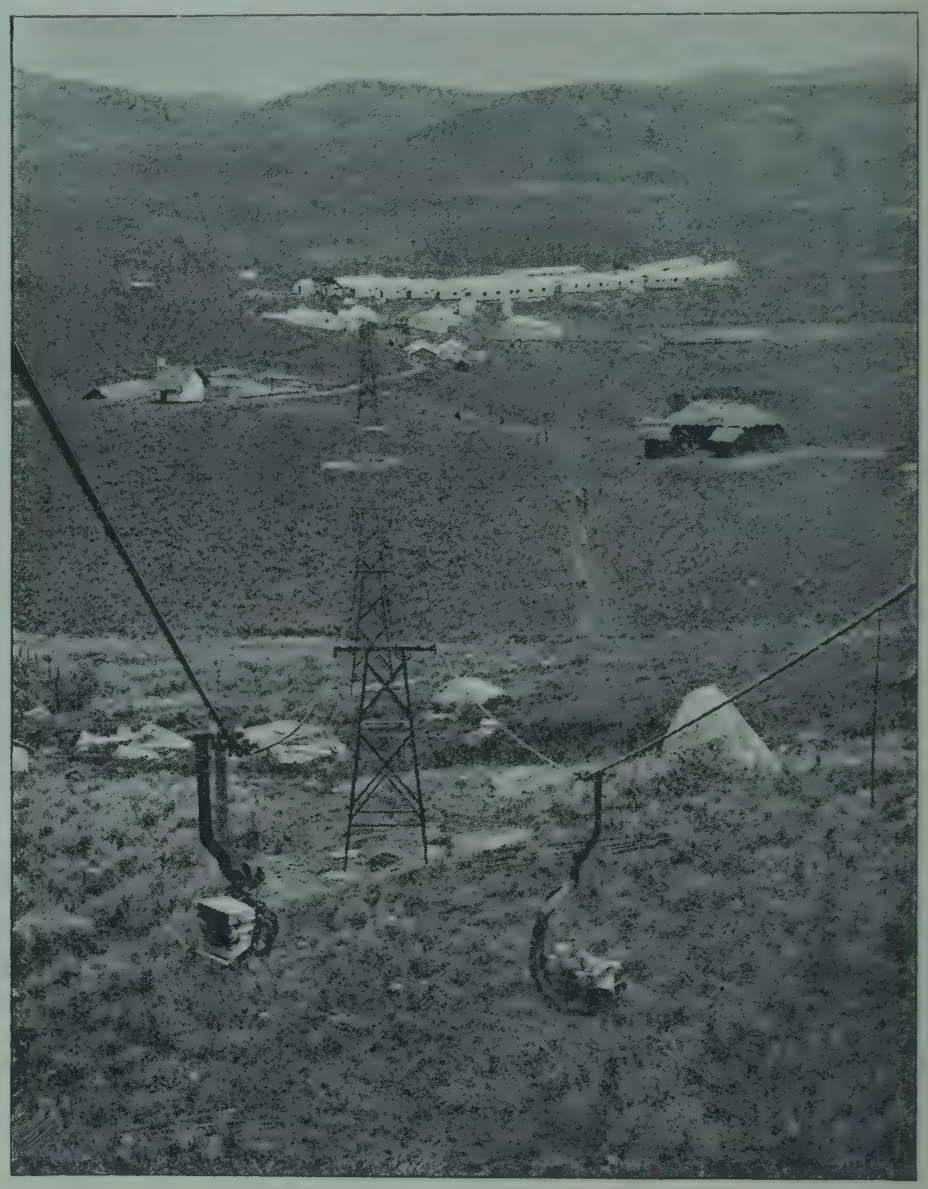
(*To be continued.*)

[1] On the next page Tropical Life offers suggestions for facilitating this time-wasting system on large estates, by running the buckets along continuous overhead wireways, as is done with pitch from the Pitch Lake in Trinidad (West Indies).

Overhead Ropeways for Tropical Produce.

In face of the difficulty experienced not only on individual estates, but in many districts deficient in railways, in bringing down the up-country produce safely and economically either to the coast or the river banks, local authorities and planters should, in many centres, be able to utilize overhead ropeways much more than they have done up to now. We say this, as so many of our readers seem to find it impossible at times not only to get their produce down to the coast or river for export, but also to carry up the manufactured and other goods that have been brought out from this side. Even when over here we can point with much satisfaction to an excellent railway running through hitherto perfectly inaccessible country, it is generally forgotten that unless feeders are sent out on either side, the persevering pioneer planter, with five miles, or even one mile, of broken country between his estate and the line, is very

Ropeway in Jamaica—General View.



Aërial Ropeway on Tea Estate in Ceylon.

little better off than he was before; whereas the very unevenness of the land would enable him to regularly feed the railway (and *vice versa*) at comparatively a low cost. The authorities themselves could often well afford to lay down such ropeways for the increased receipts of the railway, and the increased value of the land that would thereby be opened up would soon exceed the cost of the installation.

There are quite enough ropeways in use now to enable an exact estimate to be ascertained as to the cost per mile to lay one down, either for bananas or tea, as shown in the illustrations; asphalt, as in Trinidad (West Indies), or minerals, as in Algeria, Spain, Japan, and elsewhere, as well as for both passengers and goods, as in the case of an installation to the top of Table Mountain at Cape Town, or up the heights at Hong Kong. No matter whether the ground be level, up-hill, or down mountain and dale, the ropeway can be worked equally effectively, safely, and economically. On the West Coast of Africa, where so much cacao and other produce is wasted owing to lack of human carriers, overhead ropeways, with only one or two men at the terminals, could get down to the coast hundreds of tons of produce in a week, or in a day if necessary, and bring back imported articles at the same time. As we have already stated, it is quite incomprehensible in these days to still hear of produce shipped to this side being rolled down to the coast in barrels. Our fibre-growing friends are always agitating for a "raspador," or fibre-cleaning machine, that can be taken into the fields to clean the leaves as they are cut. So far such an idea, if it is to be done at all on a large scale, seems impossible or improbable. But since we cannot take the mountain to Mahomet, there is nothing to prevent our carrying Mahomet (in the shape of the sisal or fourcroya leaves) to the mountain, *i.e.*, the factory. Ropeways laden with the leaves can be so made that, by moving the trestles or supports, the planter is enabled to easily change the direction of the line in such a way as to clear all obstacles on the largest sisal or other fibre plantations at a small cost, and being at an elevation would save much space now necessary for carting the leaves. The unpleasantly spikey leaves would also have to be handled much less than when carted to the factories.

The ropeway on the banana estate in Jamaica, of which we show illustrations, has been constructed to carry 1,000 bunches of bananas per ten hours.[1] The bunches do not

[1] See also Messrs. Bullivant and Co.'s advertisement, p. xi.

exceed 120 lb. each, the average weight working out about 90 lb. The length of line illustrated is a little under a mile, and, as can be seen, there are several very steep gradients to be negotiated; so there are with the line conveying tea in Ceylon, of which an illustration is also shown. The system by which such lines are worked, however, is capable of overcoming all the trouble connected with gradients, &c. An endless running rope is carried upon supports at intervals, to which carriers are rigidly attached and consequently move with the rope. These carriers are generally made in the form of a cradle and secured by a catch, on release of which they overturn and discharge their contents into a suitable receptacle at the discharging point. The loading and unloading of the carriers can be done whilst the line is in motion. The Jamaica line runs at a speed of about 2 miles an hour, and is driven by a 3-h.p. oil engine. The whole of the plant and material was designed and supplied from this side, and was erected entirely by native labour in Jamaica without any difficulty. The trestles and frames are of timber, and the endless rope was sent out spliced to the exact length required. The rope is only ¾ in. in diameter, and an apparatus is provided for tightening it when necessary. This consists of a long screw and a powerful steel spring in compression, forming what is known as a live tension. The line illustrated has been at work for about four years, and has given complete satisfaction. From all accounts this type of ropeway is the most economical that can be constructed, both as regards its first cost and the expenses of working, and should prove of great use to many banana, cacao, fibre, tea, and other estates where produce has to be transported independently of rail or waterways.

For cleanly and expeditious transport of rubber latex on the large estates, we also expect to hear before long that overhead ropeways have come into favour.

Ramie Fibre in the Bahamas.

According to Mr. Munro Cunningham's report, a few sample Ramie stalks sent home were reported on as follows: "The fibre seems very promising; but the sticks are crooked and have lateral shoots, which should be avoided." A bulletin on ramie cultivation was published, and numerous enquiries have been answered. The plants can be grown successfully in suitable soils in the Bahamas, but its cultivation on a commercial scale is not yet recommended.

The total value of agricultural products exported from the Bahamas during the financial year ending March 31st, 1907, was £76,397, including sisal fibre, £40,140 (3,867,034 lb.); pineapples, £30,614; and grape-fruit and oranges, £2,620. In 1905-6 the exports of sisal amounted to 3,040,045 lb., valued at £37,522.

Meanwhile, according to the daily press, a new paper has been invented which it is claimed will supersede the ramie fibre and other incandescent mantles. Whether this prophecy will prove correct in the end remains to be seen.

The invention referred to is one of Professor Pierucci's, the celebrated Italian physicist of the University of Pisa, who announces that he has invented a new species of paper which is destined to revolutionize the present system of lighting, besides having numerous practical uses in electrical development owing to its remarkable conductive powers.

The professor's invention is shortly to be placed on the market in a form which is intended to supersede the mantle hitherto in use in the incandescent system of lighting. It is claimed that the new article will be much less perishable and much more powerful as a light-giver, besides being considerably cheaper. The new paper will also be on sale for cartoon and photographic purposes, and for use in filtering and in bacteriological research.

Rubber Prospects in Brazil.

One of the leading South American houses interested in rubber sent us the following letter under date February 2nd: "We should be much obliged if you would kindly let us know if there is any literature existing relating to the prospects of the natural rubber produced in South America, in view of the increased cultivation in the East. A client of ours in South America who is much interested in the development of the rubber industry, has asked us for information on this point, and as it opens up a somewhat complicated problem we think it probable that the question has been dealt with." In answer to this we sent some articles on the subject, including a copy of Tropical Life for March last, with our leading article on "The Fall in the Price of Hard Pará," together with the following letter: "In answer to yours of February 2nd, the only trustworthy matter printed *re* the prospects of rubber will be found in current tropical literature. In face of the present prices being paid for rubber, one can only feel that, for the present at anyrate, the demand exceeds the supply, although at the moment trade is not good, at least it is said not to be, and motor-cars, champagne, &c., are stated to be in less demand.

"I therefore feel that we can take to-day's trade as a good average, and this at present brings in too high a price for rubber to put tyres and floorings on a popular basis. I agree with those who maintain that when Pará rubber comes permanently to 2s. 6d. per lb.,[1] so many uses will be made of it, that all the areas under cultivation even then will be well employed to supply the demand.

"Of the Eastern centres, I would fear Ceylon the least; it deserves all it can get, but its soil tends to be worked out. Malaya, with its virgin soil and large uncultivated tracts, is more dangerous, but lacks labour. Brazil's most dangerous rival in the future will be Java, with its teeming industrious population, who are just the class to work rubber, as it is not an exacting crop, and enables the Javanese to go home and plant, and gather in their rice. If, in face of all this, Brazil ever allows herself to be cut out by the East it will be entirely her own fault, for she has the cards in her hand. We understand that besides cultivating the areas already worked, Brazil has still vast areas untouched.

"Let the States, therefore, really federate and co-operate together, and not put on vexatious inter-State restrictions and taxes. Put motor-boats on the rivers, and encourage men capable of developing her cultivated rubber and other resources without destroying them to go up into the interior to bring down the rubber, paying a royalty on the same to one centre only, not a tax to each State that they have to pass through. If Brazil does this she would attract outside labour and capital to develop her dormant riches."

[1] "When the value of rubber falls below 3 milreis per kilo., it is impossible to collect forest rubber in Bahia."—Mons. du Chenoy on Maniçoba rubber in *Journ. d'Agric. Tropicale* for December.

The Advantages of Queensland.

Rainfall.

The rainfall in Queensland is plentiful, though somewhat capricious. On the coast, the average annual rainfall in the north ranges from 60 in. to over 100 in., and on the southern coast 50 in. has been the average of thirty-five years. On the plains of the interior, from 20 to 30 in. fall every year. At intervals of from five to six years droughts of more or less intensity occur in the western districts, but these are now shorn of most of their terrors owing to the number of artesian wells which have been bored in many of the western lands. Where stock formerly died off and crops could not be raised during a dry season, the farmers and stockowners manage, by the help of these wells, to get through a moderate drought with comparatively few losses, whilst splendid crops of grain are raised in districts where no rain may have fallen during the whole year. Many of these wells yield from 1,000,000 to 4,000,000 gallons of water in twenty-four hours, thus enabling irrigation to be carried out on a large scale.

The northern districts are splendidly watered by numerous fine rivers and mountain streams, which are copiously fed from the high ranges west of Cairns, Cardwell, Cooktown, Geraldton, &c. These districts never suffer from droughts. Eleven large rivers on the east coast empty themselves into the Pacific, and are fed by numerous tributaries. Eight rivers run to the Gulf of Carpentaria, and twelve more flow to the south into New South Wales and South Australia.

It will thus be seen that Queensland as a whole is generally well watered, and only in very dry seasons do the inland rivers cease to flow. There are vast possibilities for water conservation in almost every district of the State, whilst the cretaceous water-bearing areas cover something like 150,000 square miles of the western country.

Coffee, Arrowroot, and Rice.

These are four crops which are only produced on a commercial basis in Queensland, the climate of the other States not being so suitable for their growth.

Coffee seems to thrive all along the seaboard from south to north. In the extreme south the coffee comes to great perfection. The largest areas under coffee occur, however, in the far north, particularly at Cairns, Geraldton, the Russell River, Atherton, and Mourilyan. No failure or disease has yet been recorded in the Queensland coffee district, nor has any difficulty been experienced in the matter of labour for picking the crop. The coffee produced, both in the parchment, clean bean, or in a manufactured condition, has been pronounced both in the Commonwealth and in Europe to be of excellent quality. In spite of this, however, the State still imports over a quarter of a million pounds of coffee every year, whilst exporting only about 70,000 lb. The requirements of the States amount in the aggregate to 2,500,000 lb. of coffee annually. There is an import duty of 3d. per lb. on raw coffee, and 5d. per lb. on roasted, ground or prepared, coffee, so that it will be seen that there is a splendid field for expansion in this branch of tropical agriculture. How, then, does it come about that there are in the whole of Queensland only 260 acres under the paying crop, and, furthermore, how does it happen that almost the whole of this area is in the northern or Rockingham district, and that the largest plantation only embraces 110 acres? These questions are difficult to answer, except under the supposition that farmers will not plant a crop which gives no return for three years, whilst they obtain a heavy crop of sugar cane within the first year.

The usual return on an acre of coffee trees from four to five years old is 10 cwt., but with proper care in cultivation, pruning and irrigation, quite double this quantity could be obtained. The highest yield so far has been 615 lb. of clean coffee on the Herberton tableland.

Rice.—The cultivation of rice, which in former years was carried on to some considerable extent in the northern districts, principally by the Chinese, soon extended to the extreme south of the State. The farmers in the Logan and Pimpama district took up the industry and succeeded so well that a rice mill was established. From 40 to 60 bushels of paddy per acre were then harvested and sold at an average price of 5s. to 6s. per bushel at the mill. It is calculated that the grain and straw together produced £15 10s. per acre. The variety sown was mountain rice, which requires no irrigation. Swamp rice will never be grown in Queensland, in consequence of the absence of cheap coloured labour, as no white men could undertake such laborious cultivation, and if they would do so the high price of labour would be an effectual bar to the industry.

Rice-growing, although it was fully proved to be far more remunerative than wheat or maize, received its death-blow after the great drought of 1902. For some unaccountable reason the Queensland farmer is loth to take up anything new in the way of crops. It is questionable whether they would have stuck to sugar-growing had not capitalists come along and erected large mills, and planted several thousands of acres in the best sugar districts. They grew cotton for a time, then gave it up, and fell back into the old groove of corn and potatoes. When the cotton famine occurred in 1904 the bulk of the farmers could not be persuaded that the cultivation of cotton would return them treble the value of their wheat crops, as we hope to show in a future issue would have been the case. Rice-growing will assuredly be taken up again, but at present the industry is practically at a standstill.

Arrowroot.—Arrowroot was first planted in Queensland over forty-four years ago. The plant grows luxuriantly on all the coast lands from the Tweed on the southern border to Cooktown in the far north. In the south the industry is carried on principally on the Pimpama and Coomem Rivers. Here there are steam-driven mills ranging in capacity from 10 cwt. to 30 cwt. of farina per day. The average yield may be set down at from 1 to 2 tons of farina per acre, which sells at prices fluctuating between £12 and £20 per ton.

We have just received a copy of the second edition of Mr. W. H. Johnson's book, "The Cultivation and Preparation of Pará Rubber," price 7s. 6d. net, published by Messrs. Crosby Lockwood and Son, 7, Stationers' Hall Court, Ludgate Hill, London. A full review will appear in our next issue. The chief feature of the book seems to be the careful attention that Mr. Johnson has paid to the use of machinery on rubber estate for preparing and drying the latex. Full descriptions of coagulating and blocking machines and vacuum-drying plants are included.

Costa Rica's Progress.

Energy and enterprise are beginning to show good results in the Central American State of Costa Rica; the steady work, backed up by an equally steady flow of capital judiciously invested, has caused the agriculture and commerce of this Republic to advance in a surprising degree. Notwithstanding last year's poor coffee crop—practically only half that of the preceding year's output—the total exports show a most satisfactory increase over those of the previous years, owing mainly to the development of the banana trade and the increase in the bullion exports.

The figures run as follows:—

Bananas	C10,166,551,00
Coffee	7,147,544,00
Gold and Silver	1,118,339,00
Wood	472,389,00
Leather and Skins	168,739,00
Cocoa	166,630,00
Rubber	147,369,00
Others	162,484,00
Total	C19,550,045,00
Against 1906	18,914,029,00
Increase in 1907 exports	C636,016,00

Of the 1907 exports, 48 per cent. went to America, 44 per cent. were sent to England, and 5·57 to Germany. The total value works out at a little over £5 per head of the population.

The imports into Costa Rica also show a substantial increase, as follows:—

	1907.	1906.	1905.
	C15,849,566	C14,601,165	C10,044,339
Or in U.S. currency ..	$7,476,211	$6,887,342	$4,737,896

This works out at a little over £4 per head.

Of the total, 44·95 per cent. came from America, and 23·28 only from England. Germany's share was 10·71 per cent. and France's 4·98 per cent. If our manufacturers would only advertise more freely in Tropical Life, they would find that their trade with this thriving Central American Republic would greatly increase, for as we take nearly half of Costa Rica's exports, we certainly should not be satisfied with only 23 per cent. of her orders.

Funtumia on the West Coast of Africa.

"West Africa" writes: "In the article you published in your issue of August last, you left out or missed the chief point that so strongly recommends the planting of Funtumia, namely, the less expenditure it costs for upkeep, as after the second year *Funtumia elastica* requires very little looking after, and, so far as my experience goes, it does much better when treated as a forest product. Trees 5 years old here, when treated as a forest tree, are as large as trees 15 years old that have been well looked after. The simplest and cheapest way to form a forest of *F. elastica* over here, and probably elsewhere when you can do it, is just to cut lines through the bush, about 24 ft. or 30 ft. apart, and then plant the trees about 8 ft. apart, leaving the bush in the centre of the rows. On these lines the trees do better and the cost of upkeep is trifling. Even with cultivated Hevea the planters can 'coddle' them too much. Here, near the coast, nearly all the trees have been killed by over-tapping, for *F. elastica* is a much more delicate tree than Hevea, and will not stand such frequent tapping; therefore, much longer intervals must be allowed between the tappings."

Rice Culture in Federated Malay States.

Rats giving much Trouble.

The problems of padi or rice culture have an especial interest. Long years of cultivation in many countries have evolved methods which must to a great extent command attention and carry weight, because of the fact that they are the outcome of a process of selection of the fittest methods. Though this fact should not deter from the desire to find how they can be still further improved, it gives to the problems in padi cultivation a different aspect from those with which we are faced in a new cultivation like rubber, with very little past history, and no experience wrapped up in tradition and capable of being extracted and made useful.

The experiments carried on at Parit Buntar owe much of their success to the care of Mr. F. F. Faithfull, A.M.I.C.E., Assistant Engineer, Krian Irrigation Works, who took the greatest interest in all the problems which it was hoped to solve, and recorded with great care all the necessary data. He aroused the interest of the padi-planting Malays in the neighbourhood of the experimental plots, and explained to them the purpose of the different experiments and the value of the results.

The Federated Malay States Government have spent a large sum of money in increasing the fertility of some 70,000 acres of excellent padi land by a comprehensive irrigation scheme, and it is important that all within that area should enjoy not only the advantages of the regular water supply, but that their methods of cultivation should be such that these advantages can be reaped as bountifully as possible.

I have not been able, the Director of Agriculture reports, to get accurate statistics as to the relative yields per acre outside and inside the artificially irrigated area, but all the observations I have made, and all the data I could obtain, point to the fact that the crop has been increased by probably 30 to 40 per cent. by the use of irrigation. The monetary value of this is easy to calculate.

The crops of padi all over the Federated Malay States were about average, except inside the irrigated area, where they were greater than usual, and some areas near Kuala Kangsar, which were badly attacked and damaged by rats. Mr. Gallagher kindly undertook an investigation as to methods of combating this ubiquitous pest, and his preliminary experiments with carbon bisulphide were most encouraging. They will be continued when the next padi crop is planted, and it is probable that this method may prove an effective and practical way of ridding the padi planter of one of his most constant and expensive enemies.

With regard to other enemies of padi, eelworm and fungus—more insidious because less easily detected, but causing none the less damage—these pests are automatically lessened within the irrigation area by the regular application of water and the uniform times of letting off the water and drying of the plants above ground. Where the plants are left too long in their young and tender condition without water they are open to the attacks of certain insect pests, and when they are kept too long growing in water other pests are enabled to thrive. In addition to this the value of the power of being able at any time to dry or flood the padi fields is in itself an admirable weapon against diseases.

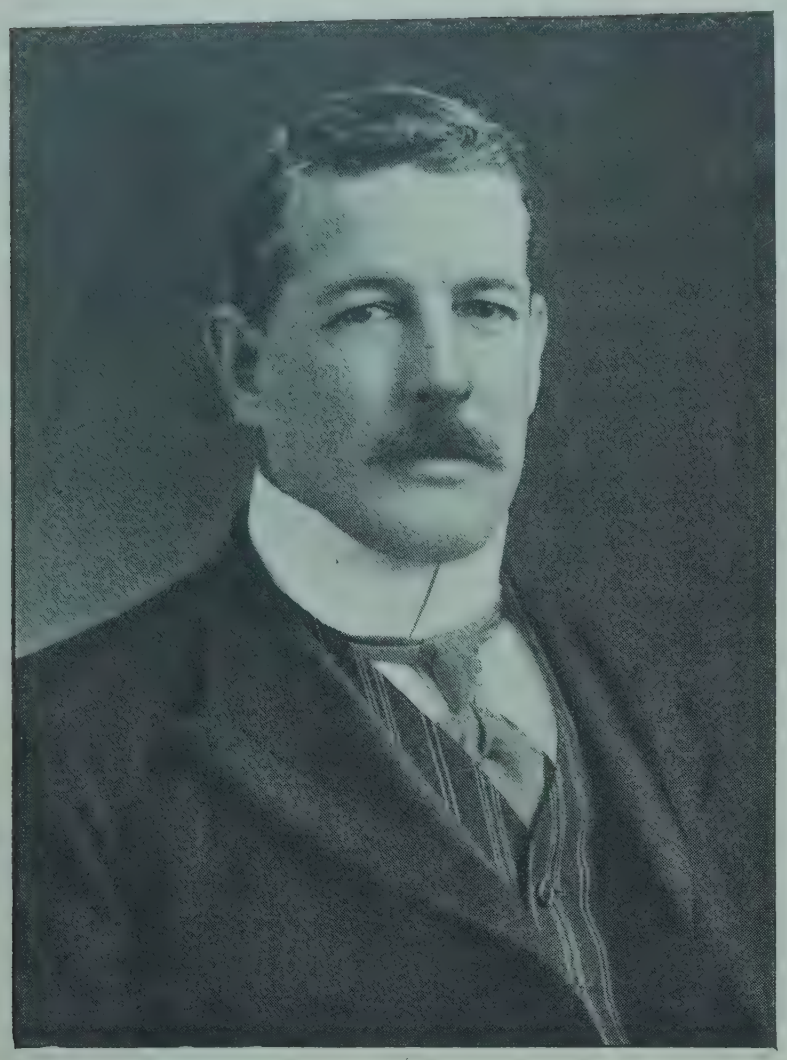


Photo by Elliot and Fry.]

"Tropical Life" Friend.—No. 46.

Mr. GEO. S. HUDSON,
Owner of Errard (Cacao) Estate, St. Lucia, West Indies.

IN our February issue we published the sketch of a leading Trinidad cacao planter who, having made a name for himself as a merchant, legislator, and planter, was now satisfied to rest on his laurels, and whilst keeping well abreast of the times so far as improvements on his estate are concerned, is satisfied to let the younger men bear the brunt of the day. One of the most strenuous of the younger school of planters, of that school which has from its inception always shown itself determined to be in the van, is Mr. Hudson, proprietor of the well-known Errard (Cacao) Estate in St. Lucia, the subject of our sketch this month.

Educated at Framlingham College, Suffolk, Mr. Hudson, after acquiring a thorough insight into the handling and sale of all tropical produce in London, transferred his energies in 1887 to St. Lucia, where his subsequent career provides a very good object-lesson of what can be done in that part of the world with patience and perseverance. In 1888—*i.e.*, after having given himself a year to look round and carefully study the *pros and cons* of the island and its various industries—"Our Friend" made up his mind to try cacao-planting. He started on a sound economical basis, not by buying a "show place," but by securing a large, undeveloped, and, in fact, an almost abandoned cacao estate, which, with the knowledge that he had gained since his arrival in the island, he could see had great possibilities in it. There were, however, many difficulties to be overcome before that success was assured that Mr. Hudson to-day can lay claim to. The nearest white neighbour was 7 miles away, and the roads (?) were more noted for causing accidents than for encouraging friendly intercourse and views between two neighbours.

Here, then, was a true case around which the romantic mind at home could weave wondrous tales of hair-breadth escapes in the Tropics. Those that do this little think how near to the truth they come at times. For ten years Mr. Hudson had a strenuous fight both with the vegetable and animal world. About 100 "fer de lance" snakes were killed every year; and not before this most dangerous reptile claimed more than one victim, was a change for the better noticeable. Under such circumstances the native snake-doctor proved a poor help, and it was not until Mr. Hudson himself initiated successful treatment that the seriousness of the bites was somewhat mitigated.

When discussing planting matters with "Our Friend" in London last year we could not help being struck at his intimate knowledge of the native West Indian character, and his suggestions how best to handle labour gangs on estates caused us to ask where he had acquired such detailed experience. "By driving my own gang," was the reply. "I did this for seven years from 6.30 a.m. to 4 p.m., and it is to this that I attribute my knowledge of the Creole character, and the possibility of the natives as field-workers. This knowledge has often proved of great benefit to me when deciding labour questions. It also gave me an intimate knowledge of tropical flora."

In 1900, Mr. Hudson was appointed Agricultural Instructor in St. Lucia to the Imperial Department of Agriculture for the West Indies, which practically took up half his time. If, however, he expended this in teaching others, "Our Friend" claims that he also was able to pick up much valuable information for himself by seeing how others strove to, and succeeded in, arriving at the same end for which they were all fighting, viz., to obtain as large a result as possible per acre of land planted. "In this work," Mr. Hudson told us, "one is naturally confronted with every variety of agriculturist, every quality of soil, a diversity of climatic influences, and a wide area of plant disease and insect pests. The first lesson to learn is to realize what you do *not* know, and the lesson most necessary to instil into both yourself and others is 'doggedness' under all circumstances." Another valuable piece of advice, or perhaps information, given by Mr. Hudson, which has stood him in such good stead, so is worth noting by others, is this: "So many new settlers and planters, physically and mentally thrash themselves to pieces in their anxiety to get on, when, under their personal supervision and superior intelligence, they can get their labourers or overseer to do the heavy part, leaving them free to see that all is done properly. In a word, watch well and worry less, and the estate will be better developed by this judicious division of labour than can ever be possible if the owner tries to do his own and the labourer's share as well."

In 1908, the work on "Errard Estate," however, became so heavy that Mr. Hudson had to leave the Imperial Department's service and devote all his time to the estate and his experimental plots, where he has since occupied himself in carrying out many valuable experiments. Later on we hope to be able to give our readers further particulars of the work that Mr. Hudson has done in this way. We only hope that many young fellows on this side will follow "Our Friend's" excellent example, and, after a thorough training in a merchant's office at home, betake themselves to the West Indies, to buy an estate economically and to run it successfully.

Business Notices.

1.—The address of Tropical Life is Messrs. Bale, Sons and Danielsson, Ltd., 83-91, Great Titchfield Street, London, W.

2.—All **literary communications** should be addressed **to the Editor,** and accompanied by the necessary stamps for their return if not accepted.

3.—All **business communications and payments**, either for subscriptions or advertisements, should be sent **to the Publishers** of Tropical Life. Cheques to be crossed The Union Bank of London, Ltd.

4.—The Subscription, which is **Ten Shillings** per annum, may commence at any time, and is payable in advance.

5.—The Advertisement Department is at 112, Fenchurch Street, E.C., where all enquiries respecting advertisements, charges, &c., should be addressed to the Manager of the Department.

6.—Changes of address should be promptly notified.

7.—Non-receipt of copies of the Journal should be notified to the Publishers.

8.—The Journal will be issued on or about the twentieth of the month.

Tropical Life.

April, 1909.

A Word to the Wise—Tea Planter.

Competitive publicity between the largely advertised brands of articles of consumption has had rather curiously divergent effects on tea as compared with coffee, and on both of these again when contrasted with cocoa. With the latter, the rivalry has tended to improve the quality of the article supplied; with coffee the movement has rather been to kill the demand for the pure article by the excessive addition of chicory, and with tea the tendency has certainly shown itself in the degradation of the public taste by the fostering of a demand for cheapness.

There will probably be hardly any question but that this country stands well in the forefront as regards the high quality of home manufactured cocoa. With coffee, adulteration is legally possible provided certain formalities are complied with, and cases are known of the sale of mixtures containing 90 per cent. of chicory and 10 per cent. of coffee. In the United States the consumption of chicory and other substitutes for coffee is enormous, and must tend to seriously depreciate the price obtained by the coffee planter for his product.

Fortunately nothing of the kind is possible with tea. Maté has some vogue in South America, it is true, but elsewhere it is not known, and no adulteration is allowed in the great tea-drinking countries of the world. On the other hand, in the United Kingdom the trade has undoubtedly been much debased by the sale of the cheaper descriptions of the genuine leaf.

It seems that advertising is fast killing—some people boast that it has killed—the taste for high-priced tea, so far as the general public is concerned. Certainly it is no longer possible to sell it in fair quantities. Blatant advertisements of "the finest tea the world produces" at retail prices, pence and even shillings below the prices really fine tea actually fetches in Mincing Lane, exclusive of duty and all the necessary expenses of putting the tea before the public, have led consumers to suppose that any price above 1s. 9d. per lb. is positively unnecessary and a waste of money. It seems a pity from every point of view. All concerned in its production, sale, and distribution, make a much more satisfactory return out of tea that is retailed at 2s. 6d. per lb. than out of one at half that price, and the consumer gets more liquor of an infinitely better quality at a very slightly increased cost per cup.

The point of view of the grower is naturally the one with most interest to ourselves. His position seems to be that he has been and is still paying the cost of the mendacious advertisements that are so widely circulated. It is not improbable that the cost of these amounts to, on the average, 2d. per lb. The duty is still 5d., and with 2½d. allowed for distribution and profit, it will be seen that the gross price receivable by the planter for a 1s. 4d. tea cannot be more than 6½d. per lb.

The first effect of the present system would seem to be to deprive those growers who take pride and pleasure in their work, and who have superior soil and appliances, of all the extra reward that is their due for their labour, and for the special advantages they have secured to turn out finer flavoured teas. This superiority is entirely due to their more careful cultivation and preparation. To obtain this much time and trouble has to be expended, and on which, therefore, the planters ought to enjoy proportionate profits, which at present they are unable to secure. Sooner or later, unless a change is brought about, the position of the growers of common tea will also be seriously compromised by the present methods of advertising.

Our readers will remember that the extraordinary misstatements referred to began with the assertion that the finest tea the world produces could be had for 1s. 9d. per lb., and then another firm went one better, several in fact, and claimed to give it at 1s. 4d. It is to be hoped, however, that competitive advertising on such lines has reached its limit, for if it continues, what is to prevent someone else asserting that finest tea can be had at 1s. 3d. or even 1s. 2d. per lb.?

It seems desirable that a concerted effort should be made by all concerned to put this position clearly before the public. It is always difficult, of course, to induce consumers to pay a higher price than that to which they have been accustomed, even if it can be proved to them that the higher price is in reality the cheapest.

It would seem as though the line of least resistance would lie in the direction of the reduction of the Tea Duty. It is far easier to persuade the buyer of 1s. 4d. tea to continue at the same price after the duty had been lowered, if it is shown to him that he is receiving a correspondingly increased value in his purchase, than it would be to get him to pay a higher price without such reduction. Secondly, a great deal might be done to bring the grocer up-to-date in his methods, and induce him to retail a high-class tea at a moderate profit, and bring it before his customers by intelligent local advertising and his own ability as a salesman. But we repeat, the main thing is to first get the burden of the duty reduced, and after that to teach the grocer to develop, and then to rely upon his own judgment as a tea-taster, so that he need not depend on costly advertising schemes to sell his wares. Let him prove to his customers, by means of small samples, that he can give them better tea for the same price than the advertised brands, and then take care to maintain the standard of quality he has set before them. Those that have done so flourish, whilst those that depend on others to do their tasting for them either fail in their business or merely exist whilst working long hours and incurring considerable risks for no profit to themselves worth mentioning. The large proportion of failures in what should be a profitable business

shows on what unsatisfactory lines the present grocery trade is carried on. It is high time, therefore, that both the producers and vendors of the higher class teas should look seriously into the matter, and not rest until they have made a radical change in what is perhaps the most important department, as regards profits, in the grocery trade.

A Valuable Fibre Plant

(*Asclepias semilunata*).

By Chas. A. White, F.R.H.S., &c.,

Uganda Protectorate; late Forest Officer, Coolgardie, W.A.

When the Coolgardie goldfields were first known, I was an employé in the Melbourne Botanic Gardens, and having been seriously attacked by the gold fever was, with thousands of others who have been more or less successful, soon upon the field. That was at the end of 1893. Some two years after, while camped near Bulla-Bulling at an old deserted camp, I was astonished to find some oats in full ear; but what struck me principally was a plant producing white clusters of flowers, and large bladder-like capsules containing a fluffy, silky fibre like the Scotch thistle, and producing a white milky substance similar to rubber. This plant must have been brought by seed in imported forage.

When the South African War broke out, I got the war fever, and proceeding to Africa, remained there, having travelled from the Cape to the Zambesi, Portuguese Africa, and then to the Equator and Congo. In all these countries this particular plant was seen in isolated parts, but not cultivated. Nobody knew of its value, only that the silky cotton could be used like kapok for stuffing furniture, and would not pay to export. This is merely mentioned to show that it can adapt itself to various climates, although indigenous to the Congo, Uganda, and Abyssinia. While at Uganda, planting rubber at the head of the Nile on the Victoria Nyanza, I wanted some rope for a line, and requested a native to get some, thinking he would get the bast of a banana. Much to my surprise the boy started pulling this particular plant, and drawing the fibre, then twisting it into rope of remarkable strength. I then forwarded samples of rope, fibre, and botanical specimen to the Imperial Institute, London, with the result that the plant was identified as *Asclepias semilunata*, and the fibre, if properly prepared, was valued, on the London market, at £35 per ton. The examination of samples sent from Uganda has shown that it is very strong and of excellent quality, and would doubtless be useful for cordage manufacture, but it has not yet been exported in sufficient quantities for actual trials on a manufacturing scale. It is possible that the fibre might also be utilized for the manufacture of explosives, but this question is at present under investigation. I sent a sample of the fibre and a quantity of seed to the Hon. John Perry, M.P., to test if it can be successfully grown in New South Wales. I feel confident that it can be profitably grown, as its geographical distribution is so well known to me; I have seen it at an elevation of 7,000 ft. above sea-level at Johannesburg; also at Rhodesia, and in Australia; but have not seen it near the coast, though it may succeed near the sea. The cultivation of *A. semilunata* is simple: sow as you would wheat or oats, after the land has been harrowed; seed thickly, so as to produce stems 5 ft. to 6 ft. long. It will grow on stony land, on the flat or hill-sides; it requires no irrigation, and will withstand drought with impunity. With cheap freight from Sydney to London, let alone local market, this fibre may prove to be a desirable subsidiary industry for New South Wales. The writer, who is an Australian, thinks that the seed must at some time have been introduced into Australia by the late Baron von Mueller, otherwise it is a mystery how he saw it at Coolgardie. The writer trusts that through the columns of the *Agricultural Gazette* more will be heard from tests in New South Wales.

The sample of fibre forwarded to the Hon. the Minister for Agriculture was submitted to Messrs. Forsyth and Co., rope manufacturers, Sydney, who reported as follows: "The fibre is equal to Manila, and is valued at £35 per ton. The length and colour are good. They would give £35 per ton for it, but the fibre must not be less than 4 ft. long. The quantity submitted was too small to make a test."

Reviews.

Workshop Receipts, for Manufacturers, Mechanics, and Scientific Amateurs. New and thoroughly revised. Part I. (Acetylene-drying), with 223 illustrations, 518 pp. + 14 of index. Price 3s. net. London: E. and F. N. Spon, Ltd., 57, Haymarket. New York: Spon and Chamberlain, 123, Liberty Street.

This is a most handy book for all sorts of men in all parts of the world. In this volume twenty-eight pages are given up to the drying and desiccation of produce, fifteen to distilling, fifty pages to cements, lutes (to make tight joints), and glues. The building of chimneys also occupies an important space, and so does the cleaning and bleaching of fibres, silk, feathers, hair, ivory, &c. The information on boiler corrosion and incrustation is worth noting; and several pages are devoted to alcohol generally. As a handy, popular guide when in a hurry or an emergency, the above, as a book of reference, will be difficult to beat, and makes one anxious to become acquainted with the volumes still to appear.

The Geology of the Goldfields of British Guiana. By Professor J. B. Harrison, C.M.G., M.A., &c., Government Geologist and Director of Agriculture and Science, with Historical, Geographical, and other chapters by Mr. Frank Fowler, Commissioner of Lands and Mines, and Mr. C. Willgress Anderson, F.G.S., F.R.G.S., Government Surveyor.

The above book, which is published by the direction of Sir Frederic M. Hodgson, K.C.M.G., Governor of British Guiana, besides the several sections mentioned above, also includes within its 320 pages an appendix giving the laws and regulations governing the mining industry of British Guiana. The book is illustrated with thirty-three reproductions of photos of the scenery of the colony, which show that it contains views that vie even with the lovely Roseau Valley of Dominica, or our own beautiful Devonshire scenery. Neither of these centres, and indeed very few, if any, other places, can lay claim to the wonderful waterfalls that British Guiana can boast of, especially the Kaieteur Falls on the Potaro River, a most realistic photo of which, taken by Mr. Anderson, is most appropriately used as the frontispiece to the book. The perpendicular height of the fall, we are told, is 741 ft., or nearly five times the height of Niagara.

Besides photographs of the scenery, &c., there are also

ten photomicrographs of sections of typical rocks taken by Mr. J. Williams. These add considerably to the interest of the instructive notes on the geology of the colony.

The whole concludes with a well drawn-up and exhaustive index, which greatly adds to the usefulness of the book. We congratulate Professor Harrison and his collaborators on the result of their labours. Anyone interested in British Guiana as a gold and diamond producing colony should obtain a copy of this book, price 5s. net, from Messrs. Dulau and Co., 37, Soho Square, London, W.

What the English are Doing in Egypt.

Third Report of the Wellcome Research Laboratories at the Gordon Memorial College, Khartoum, under the Directorship of Andrew Balfour, M.D., B.Sc., &c. 477 pp., including 27 pages of index, with 48 coloured plates and over 200 illustrations. Price 21s. Baillière, Tindall and Cox, 8, Henrietta Street, Covent Garden, London, W.C.

Review of some of the Recent Advances in Tropical Medicine, Hygiene, and Tropical Veterinary Science, being a Supplement to the Third Report of the Wellcome Research Laboratories, by Dr. Andrew Balfour, M.D., B.Sc., &c., Director, and R. G. Archibald, M.B., R.A.M.C., Pathologist and Assistant Bacteriologist. 250 pp., including 13 pages of index. No illustrations. Price 10s. 6d. Baillière, Tindall and Cox, as above.

We have on several occasions in reviews, current articles, and passing quotations, called attention to the valuable work that the Wellcome Research Laboratories have done in the Khartoum provinces under the Directorship of Dr. Balfour and his staff. Judging by the size of the books mentioned above, which, as can be seen, run into nearly 750 pages, the work undertaken by the Laboratories must have greatly increased of late. So far as we are able to judge with our limited knowledge of the subject, we have no hesitation in saying that this increased work has not only not detracted from the thoroughness of the investigations, but seems to have stimulated and encouraged the staff to inspect and examine everything that came under their notice with redoubled care and attention.

The report includes papers by medical officials who, if not actual members of the staff, still have apparently been carrying out exhaustive research work in the Laboratories. We also note that the sciences of Ethnology (study of racial diversities), Ethnography (science of peculiarities of different races), and Anthropology have received considerable attention. The papers on these form a valuable addition to former reports and works on the same subjects. Much attention has also, we are very glad to see, been devoted to the question of Tropical Sanitation.

We shall be publishing, as we did when the Second Report appeared in 1906 (price 17s. 6d.), an article on the Gums of the Soudan, based on the notes of Mr. E. S. Edie, B.Sc., otherwise it is impossible to give more than a list of the contents of the volume, which includes :—

Trypanosomiasis in the Anglo-Egyptian Sudan, Hæmogregarine of the Jerboa, Hæmogregarine of *Ramphiophis rubropunctatus*, Piroplasmosis in the Anglo-Egyptian Sudan, Spirochætosis of Sudanese Fowls, Routine Work, Miscellaneous Notes, Sanitary Notes (Khartoum), Sleeping Sickness in the Bahr-El-Ghazal Province, by the Director; Additional Notes dealing with Sleeping Sickness in Uganda, by R. G. Archibald.

Kala-azar in the Anglo-Egyptian Sudan, by S. Lyle Cummins; Observation on Kala-azar in Kassala Province, by L. Bousfield.

Report of Travelling Pathologist and Protozoologist, by C. M. Wenyon; on some Interesting Reptiles collected by Dr. C. M. Wenyon on the Upper Nile, by Dr. Franz Werner; the Poisonous Snakes of the Anglo-Egyptian Sudan, by Doctor Franz Werner; an Account of some Helminthes contained in Dr. C. M. Wenyon's collection from the Sudan, by Robert T. Leiper.

Report on Economic Entomology, by Harold H. King; New Mosquitoes from the Sudan, by Fred. V. Theobald.

The Healing Art as practised by the Dervishes, by Hassan Effendi Zeki; the Native Methods of Treatment of Diseases in Kassala and Neighbourhood, by L. Bousfield; Additional Notes, by Sir R. Baron von Slatin Pasha; Medical Practices and Superstitions amongst the People of Kordofan, by R. G. Anderson.

Report upon the Physical Characters of some Nilotic Negroid Tribes, by D. Waterston.

Notes on Ethnographical Specimens collected by Dr. A. MacTier Pirrie, by D. J. Vallance.

Report of the Chemical Section, by William Beam; Notes on the Chemistry of Sudan Gums, by E. S. Edie.

The Supplement, or Review, is intended to serve as guide to new books and papers in that rapidly growing science, Tropical Medicine; and to present in a small compass the more important recent discoveries on the subjects indicated. Full references are given to sound practical papers, which are likely to be helpful to those who wish to go more fully into any special subject, but the scientific aspect of certain questions has not been neglected.

This book will stimulate research, and lead to the acquisition of useful information in directions where knowledge as regards tropical and veterinary medicine, bacteriology, and hygiene is still deficient. Among a multitude of items, its contents include notes on bacteriology, beri-beri, blackwater fever, cholera, clothing in the Tropics, diphtheria, dysentery, elephantiasis, enteric, filters, milk, sleeping sickness, spider bites, vaccination, veterinary diseases, &c.

What is Brandy?

Brandy, said Dr. Philip Schidrowitz, the well-known analytical chemist, who has made a special study of potable and industrial spirit, speaking before the Royal Commission on Potable Spirits, might be defined as a spirit derived by distillation from the fermented juice of *any* fruit. He used the word "fruit" because in some of the orchard districts of America the word "brandy" would be held to apply to spirit derived from apples or pears. In America there is a substantial amount of "brandy" made apart from grapes. He certainly objected to any mixture of grape spirit and other spirits being called "brandy." He once had a sample termed Egyptian brandy. There were no vines in Egypt. That sample struck him as a mixture containing a good deal of rectified spirit.

Irrigation is a growing science, and is becoming more and more exact. Especially in Egypt and our Colonies is the problem of conserving the water attracting close attention.

Wire Fencing: A Big Trade neglected by the United Kingdom.

We have repeatedly called the attention of manufacturers on this side to the trade that is being done, and could be greatly developed, in woven wire and wire fencing. Of late our contemporaries have also been calling attention to the matter, among them being the *Agricultural Journal* of Natal, and *Farm Machinery*. What is reported by these two journals of the trade to be done in one or two centres only are but repetitions of what we hear from many more. Again, much more could be done if makers of woven wire and wire fencing took more trouble to show rubber planters and others how greatly it is to their interest to adopt fencing on their estates, instead of letting the more go-ahead ones find it out for themselves, and leaving the great majority to never realize the fact at all.

"In Natal," the Natal *Agricultural Journal* tells us, "we can generally secure wood for fencing posts, often for next to nothing, but in the United States the growing scarcity of wood makes it impossible to use this material for all the fences that are being built, and steel is taking its place. The woven wire fence, made so strong that it resists the attempts of the most vicious cattle to break through, and in shapes and sizes to suit the varied requirements of the farm, is becoming more and more indispensible to modern civilization, and its manufacture represents an important industry in America.

"In many parts of Western America the top wire of of the fence is employed for telephone purposes. Millions of acres of land are enclosed in this way, and sections of the country can thus be tapped by telephones at little expense. These lines are more suitable in wild districts than special wires strung from high poles, as they are not so liable to destruction by heavy wind-storms and snow. On the large farms, too, the distance from some of the fields to the house is often such as to make communication by telephone important. The fence that runs to the nearest point is tapped, and portable telephones are taken from place to place. The manager can thus give orders to men in widely separate parts of the estate, without sending messengers backwards and forwards. Many flocks, we learn from *Farm Machinery*, have been rescued from destruction by warning of a blizzard through the medium of fence telephones. They have also been used as fire alarms, and forest reserves have been saved by prompt notice of the danger of conflagration, over these wires. With all these varied uses, it is not surprising that the farmers of America are buying fifty thousand miles of wire fence every month—according to our contemporary, which also says that four-fifths of all the wire fence made in the world is manufactured in America, and that enough is produced in that country every fortnight to go around the world."

The Year's Tea Exports (in lbs.) from Java—January 1st to December 31st, 1906-07-08.

(From Mr. H. Lambe's Circular.)

	1908.	1907.	1906.
To Holland	20,059,300	15,670,500	15,290,000
,, United Kingdom ..	12,629,100	9,167,300	10,937,000
,, Russia..	1,294,500	813,600	619,400
,, Australia	335,100	724,200	178,500
,, Singapore	2,061,200	1,974,800	224,500
,, Other Ports	200,400	936,000	205,700
	36,579,600	29,286,400	27,455,100

Sugar.

Mr. C. Czarnikow, writing on April 8th, reported that quotations in America receded from 4.02 to 3.98 cents (occasionally even 3.95 cents), and only five Cuban factories stopped during the week, whilst receipts were as high as in 1906, when double the quantity remained to be made; therefore our market has been rather quiet since our last, May moving from 10s. 5d. to 10s. 4d. to 10s. 4½d., equal to about 4.16 cents. for America. Nor was the trade demand very active, partly from proximity of holidays, partly because fair stocks seem to have been accumulated.

If we have large entries of Russian here early in April they may be part of the March exports from Dantzic, otherwise it seems as if illegal entries continued to be made here. Whether we shall have a further excess in duty payments during April remains to be seen; the Budget will be brought in on the Monday or Thursday of the second week after the recess (26th or 29th inst.), and there are no indications either *pro* or *con* whether sugar will be affected—probably the Cabinet themselves do not know yet—but we may have a dull period after that until the present accumulations have disappeared. That, of course, does not mean that finally there will be too much sugar, unless we have more Javas and Cubas or less consumption than the figures we printed lately, but it is said that consumption, especially in America, might easily show a larger excess with more prosperous times and a good fruit crop.

The New York market has lacked activity, and the value of 96 per cent. centrifugals has declined to 3.98 cents = 10s. 6¾d. c.i.f. for non-preferential 96 per cent. = 9s. 6¾d. f.o.b. Hamburg for 88 per cent. net Beet. There is no doubt that consumers in the United States are watching the progress of the Cuban crop very carefully, and, as their requirements are now covered for the present, they naturally abstain from important operations until the result in the island is more clearly seen. In the meantime, consumption is going on satisfactorily, and, with the improving industrial conditions, may show further expansion. The landings in the three ports for the week amount to 70,000 tons, and, with meltings of 45,000 tons, stocks now stand at 297,000 tons.

Transactions in cane sugar in the United Kingdom have again been small; several sales were made at outports at former prices, and the quantities offering are still very moderate. Crystallized grocery descriptions have been rather neglected by the trade. From cane-growing countries there is nothing new to report.

The total transactions in British West India for the week amounted to about 7,000 bags. Crystallized Demerara, fine palish yellow sold at 16s. duty paid; fine bright yellow, 16s. 6d. Crystallized Trinidad, good middling palish, 15s. 1½d. to 15s. 3d.; good middling yellow, bold grain, 15s. 6d.; good yellow, 15s. 9d. Crystallized St. Lucia, middling yellow, 15s. Jamaica Muscovado, fine soft yellow, 15s. 9d.

At auction of 250 packets Guatemala offered, 150 good strong yellowish semi-grainy sold at 13s. 9d. duty paid.

In Liverpool 150 tons Peruvian afloat, basis 96 per cent., at 11s. 6d. floating, landing, and basis 89 per cent. at 9s. 6d., floating, landing, to Clyde; 3,100 bags syrups at 9s. 3d. to 9s. 7½d. quay terms; 2,008 bags Mexican at 11s. 9d. quay; 750 tons Domingos at 11s. 9d. quay, 5,500 bags at 11s. 6d. to 11s. 9d. quay.

Cotton.

The following were the prices for Cotton in London on March 11th, according to Messrs. Slann and Davies :—

	Good Fair.	Good.	Fine.	Superfine.	Compare Good 1908.	Compare Good 1907.	
	d. d.	d. d.	d. d.	d.	d. d.	d. d.	
Surat kinds * ...	$4\frac{3}{16}$ to $4\frac{9}{16}$	$4\frac{7}{16}$ to $4\frac{13}{16}$	$4\frac{11}{16}$ to $5\frac{1}{16}$	—	$4\frac{1}{2}$ to $4\frac{15}{16}$	$4\frac{5}{16}$ to $5\frac{3}{16}$	per lb.
Madras	$4\frac{9}{16}$ to $4\frac{3}{4}$	$4\frac{3}{8}$ to 5	—	—	$3\frac{15}{16}$ to 5	$4\frac{7}{8}$ to $5\frac{5}{16}$	—
Bengal	$3\frac{11}{16}$	$3\frac{15}{16}$	$4\frac{3}{16}$	$4\frac{5}{16}$	$3\frac{9}{16}$	$3\frac{1}{2}$	—
Assam	—	$4\frac{3}{8}$	$6\frac{1}{4}$	$6\frac{3}{4}$	$4\frac{1}{2}$	$5\frac{1}{4}$	—
China	—	$4\frac{7}{8}$	$5\frac{1}{2}$	$5\frac{7}{8}$	$4\frac{1}{2}$	$5\frac{1}{8}$	—
West Indian ...	$4\frac{3}{4}$	$5\frac{1}{4}$	$5\frac{3}{4}$	6	$6\frac{3}{4}$	$6\frac{7}{8}$	—
Sea Island	$6\frac{1}{2}$	$8\frac{1}{8}$	13	15	10	$11\frac{1}{2}$	—
Australia	$5\frac{5}{8}$	6	—	—	$6\frac{3}{4}$	$6\frac{3}{4}$	—

* Liverpool quotations.

The improvement noted last week, ending April 3rd, has considerably broadened, especially in America, where the dry weather in Texas is again discussed, and some good buying has hardened prices up for future deliveries 16 to 22 points. Manchester, although complaining of small profits on manufactured goods, continues to take a fair quantity of Cotton daily ; Spot Middling is quoted 28 points higher at 5·27d. per lb. A material advance has taken place in prices of East Indian, owing to reports of diminished supplies, and shippers' quotations are from $\frac{1}{8}$d. to $\frac{7}{16}$d. dearer, but no business has been possible.

The import into Liverpool this week amounts to 23,274 bales; since September 1st, 3,512,817 ; same week last year, 31,524; last year's total, 3,085,681 bales. The estimated Sales amount to 47,000 bales. Middling American is quoted at 5·27d. per lb. ; last year, 5·67d. ; 1907, 6·12d.

The latest quotations of Americans for delivery bases, middling, any port, G.O.C., were :—

	April 8th.	Last Week.	Last Year.
	d.	d.	d.
April	$5{\cdot}15\frac{1}{2}$	$4{\cdot}93\frac{1}{2}$	5·21
April—May	5·15	$4{\cdot}93\frac{1}{2}$	5·19
May-June	$5{\cdot}15\frac{1}{2}$	4·96	5·19

Movement of American Cotton since September 1st :—

	1908-9.	1907-8.	1906-7.
Brought into sight	11,932,000	9,973,000	12,098,000
Exports from United States since September 1st—			
To Great Britain	3,026,000	2,576,000	3,275,000
To Continent, &c.	3,838,000	3,564,000	3,731,000
Total crop	—	11,571,966	13,510,982

Coffee.

By Messrs. C. M. and C. Woodhouse.

No East India was offered during the week ending April 10th, but the first arrivals of the delayed Costa Rica were submitted on the 6th, and meeting with a strong demand, chiefly from the home trade, all sold at full prices. At this week's sales the market was quieter, and the bold sizes were neglected, the bids made being considerably below yesterday's values. Other Central American kinds close without alteration. The market for futures has presented no features of interest, and the closing prices show little change from those ruling last week. We quote :—

		1909.	
		April 8th.	April 1st.
London ..	Santos, May delivery.	33s. 6d.	33s. 3d.
New York ..	No. 7 Rio ,,	6·85 cents	7·00 cents.
Hamburg ..	Santos ,,	$35\frac{3}{4}$ pf.	$35\frac{3}{4}$ pf.
Havre ..	Santos ,,	$45\frac{1}{2}$ francs	$45\frac{3}{4}$ francs.

The receipts at Rio and Santos from July 1st, 1908, to April 6th, 1909, were 11,527,000 bags against 9,212,000 bags and 16,423,000 bags in the two previous seasons respectively.

Sales include the following, viz. :—

Jamaica.—58 barrels and bags, at 41s. to 46s. for smalls, 44s. to 48s. for fine to fine fine ordinary, 57s. for low middling, 53s. to 68s. for low middling to good middling bold.

Costa Rica.—3,600 bags, at 49s. 6d. to 62s. for ordinary to fine smalls, 59s. 6d. to 79s. for middling to fine middling, 73s. to 85s. 6d. for good to fine bold.

Guatemala.—1,600 bags, at 42s. 6d. to 50s. 6d. for smalls, 49s. 6d. to 58s. 6d. for low middling to good middling, 54s. to 63s. for middling to good middling bold, 98s. for Maragogipe.

Nicaragua.—290 bags, at 36s. 6d. to 45s. for smalls, 52s. 6d. to 53s. for middling, 56s. 6d. to 59s. for middling to good middling bold.

Salvador.—120 bags, at 47s. for smalls, 52s. 6d. to 55s. 6d. for middling to good middling.

Mexican.—120 bags, at 53s. for middling, 57s. to 59s. for good middling bold.

Vera Paz.—154 bags, at 49s. for smalls, 63s. for good middling, 69s. 6d. to 73s. for good middling bold.

Ecuador.—57 bags at 38s. to 38s. 6d. for bold palish foxy.

La Guayra (Venezuela).—108 bags, at 38s. for smalls, 52s. for middling, 56s. to 58s. for good middling bold.

Colombian, &c.—450 bags, at 47s. 6d. for smalls, 50s. to 56s. 6d. for low middling to good middling.

Dumont Santos.—380 bags unwashed at 36s. for smalls, 38s. for medium.

A Grenada correspondent asks whether it would pay nutmeg-planters to extract the oil from the nutmegs, and, if so, which process is best and most economical.

The India-rubber Market.

By Messrs. S. FIGGIS AND Co.

Pale Ceylon Crepe up to 5s. 9d.

SINCE your last appearance, our market has had the usual fluctuations. The sales on March 26th were quiet and closed a penny lower.

Fine Hard.—Sold at 5s. 2½d., April 5s. 2d., May 5s. 1½d.

Fine Soft.—Sold at 5s. 1½d. to 5s. 1¼d.

Negrohead.—Manoas, scrappy, 3s. 11d.; Cameta, 2s. 9d.; Island, 2s. 4¼d.

Caucho Ball.—Spot, 3s. 4¾d., May delivery, 3s. 5¼d.

At auction on the 26th ult. *Plantation* sold readily, Pale crêpe and sheet about 1d. lower; dark and brown, steady.

Plantation Malay.—Sheet, good to fine pale, 5s. 3d. to 5s. 4½d.; crêpe, fine white, 5s. 5½d. to 5s. 6d.; good to very fine pale, 5s. 3¼d. to 5s. 4¾d.; fair to good palish, 5s. 2d. to 5s. 3d.; light brown and grey, 5s. 0½d. to 5s. 2d.; clean dark brown, 4s. 10¼d. to 4s. 11½d.; dark and specky, 4s. 8d. to 4s. 9½d.; black softish, 4s. 3¾d. to 4s. 6½d. Scrap, fair to fine, 4s. 5d. to 4s. 7¼d.; mixed, part inferior, 4s. 2d. to 4s. 4¾d. Rambong, good clean red crêpe, 4s. 9d. to 4s. 11½d.

Ceylon.—Sheet and biscuit, fine pale, 5s. 4¼d. to 5s. 4¾d.; fair to good pale, 5s. 3½d. to 5s. 3¾d. Worms, fair to fine pale, 5s. 3½d. to 5s. 4½d. Crêpe, fair to good pale, 5s. 2d. to 5s. 4½d.; clean brown, 4s. 11¾d. to 5s. 1¼d.; dark brown, 4s. 8¼d. to 4s. 10d.; dark and black, part soft, 4s. 3¼d. to 4s. 7¾d. Scrap, fair to fine, 4s. 6d. to 4s. 7¼d.; Mixed, part inferior, 4s. 1d. to 4s. 2½d.

Mozambique.—Clean reddish Beira ball, 4s. 1d.

During the next week (ending April 2nd), hard fine was wanted to cover March sales, and a considerable business was done at 5s. 2½d. to 5s. 2¾d., and later up to 5s. 2d. was paid for May to June delivery. Sales of soft took place up to 5s. 1d. By April 8th the market had hardened and Pará showed an advance of ½d. to 1d. per lb. Fine hard realizing 5s. 2½d. to 5s. 3d.; fine soft, 5s. 2d. Plantation sheet and biscuit at 5s. 3½d. Crêpe at full prices up to 5s. 6d. for very fine.

During the next week prices again went higher with sales of fine hard and Bolivian up to 5s. 3½d., fine soft up to 5s. 2½d., and at the auctions on April 16th active competition again caused a further rise of 1½d. to 2d. for plantation and fine hard sold up to 5s. 3½d.

Prices at the auctions on April 16th included :—

Plantation Malay.—Sheet, fair to fine, 5s. 4¾d. to 5s. 5½d. (very fine smoked, 5s. 6d. to 5s. 6¼d.); mixed and inferior, 4s. 9d. to 5s. 1½d. Crêpe, very fine pale, 5s. 6¼d. to 5s. 6¾d.; good to fine pale, 5s. 4½d. to 5s. 6d.; fair to good palish, 5s. 3½d. to 5s. 4¼d.; light brown and grey, 5s. 2½d. to 5s. 3¼d.; clean and dark brown, 5s. 1¼d. to 5s. 2¼d.; dark and specky, 4s. 11½d. to 5s. 1¼d.; black softish, 4s. 5½d. to 4s. 10¾d. Scrap, fair to fine, 4s. 6½d. to 4s. 10d.; mixed part inferior, 3s. 6d. to 4s. 4½d. Rambong, crêpe, good clean red, 4s. 9d. to 5s. 1½d.; dark and pressed, 4s. 4½d. to 4s. 6d.

Ceylon.—Sheet and biscuit, fair to good pale, 5s. 4¾d. to 5s. 5¼d. (one lot very fine pale, 5s. 9d.). Worms, good pale, 5s. 7d. Crêpe, fine thick pale, 5s. 7d.; fair to good pale, 5s. 2¾d. to 5s 5½d.; clean brown, 5s. 1½d. to 5s. 2½d.; dark brown, 4s. 10¾d. to 5s. 1d.; dark and black, part soft, 4s. 7d. to 4s. 9¾d. Scrap, fair to fine, 4s. 7¼d. to 4s. 9¾d.; mixed, part inferior, 4s. to 4s. 4½d.

Uganda Plantation.—Sheet, fair brown smoked, 5s. 3d. to 5s. 4½d. Crêpe, one lot dark pressed, 4s. 0½d.; rough pieces, part heated, 2s. 9½d.

Orinoco.—Fine unsorted, 5s. 2½d.; nuggets, 4s. 3d.

Mollendo.—Fine, 5s. 1½d.; entrefine, 4s. 10d.; virgin, 4s. 6d.

Central American and Columbian.—Fine smoked pressed brown scrap, 3s. 10¼d. to 4s. 0¼d.; fair to good brown scrap, 3s. 2¾d. to 3s. 6¼d.; slab, 2s. 7¾d. to 2s. 8¾d.

Mozambique and Zanzibar, &c.—Fair to good Lamu ball, 3s. 3½d. to 3s. 5d.; Mombasa ball, 3s. 2¼d.; sandy sausage, 2s. 10¼d.; Uganda pears (two bags) 3s. 6½d.

Madagascar.—Clean washed ball, 2s. 10¼d.; black slab, part gummy, 2s. 4½d. to 2s. 5¾d.; good livery slab, 2s. 9¾d.; grey rooty slab, 2s. 0¼d.

Abyssinian.—Fair sheet, 3s. 3d. to 3s. 3¼d.

Rangoon.—Fair red, 3s. 4½d.

Pará rubber statistics for the month of March (tons) :—

	Pará.	Caucho.	1909.		1908.	1907.	1906.
Receipts at Pará ..	2,910	1,230	= 4,140	agst	4,240	5,830	3,700
Shipments to Europe	1,630	850	= 2,480	,,	2,720	2,810	2,510
,, America	1,430	540	= 1,970	,,	1,420	2,450	1,870

Crop statistics, June 30th, 1908, to March 31st, 1909 :—

		Pará.	Caucho.	1908-09.	1907-08.	1906-07.	1905-06.
Pará Receipts	1908-09	25,070	5,350	30,420	28,680	29,390	28,020
	1907-08	23,950	4,730				
,, Shipts.,	Europe	10,780	3,580	14,360	17,110	13,760	16,155
,, ,,	America	13,340	1,720	15,060	10,560	14,710	11,835

Tea.

By Messrs. WM. JAS. AND HY. THOMPSON.

VERY little change in quotations has taken place during the past week ending April 10th, although there is still a firmer tendency for all the better liquoring parcels, with an occasional advance for stand-out quality, while the inferior mixed qualities of Indian tea usual at the end of the season were marked by some amount of irregularity.

A satisfactory feature of the London figures for March is that while total imports exceed those of the same month last year by 1,000,000 lb., total deliveries are no less than 13,000,000 lb. ahead (32,442,595 lb. in March this year, 18,923,266 lb. last year, and 15,000,000 lb. in 1907), due almost entirely to the exceptionally heavy clearances of Indians (20,670,043 lb. against 11,037,055 lb. in March, 1908), which show an increase of 9,000,000 lb. Stocks on the last day of the month stood at 94,000,000 lb., against 112,000,000 lb. last year.

The closing sales of Indian before Easter were somewhat reduced, 29,365 packages against 36,638 packages last year, making the total advertised for the season to date (including South Indian teas since August 1st) amount to 1,355,713 packages, compared with 1,267,887 packages a year ago. No material change can be quoted this week. A continued steady enquiry for good liquoring descriptions has been the feature of the sales. Fine and finest grades sold well, bright tippy teas commanding full prices, with an occasional advance. Assam leaf teas were in strong demand, a fair number of export orders materially helping these grades. Cachar and Sylhet growths can be quoted steady, although parcels of a reddish, stalky nature were inclined to easiness. Common tea, although well competed for, sold without any further change in prices, clean sweet Pekoe Souchong being bought in fair quantity at 6¼d. per lb. The Darjeeling crop is now practically closed. A useful selection of

Southern Indian teas were included in the catalogues, and sold steadily at firm to advancing rates. The next sale will be held on Monday, the 19th inst.

The best averages realized were: Assam—Tara, 11¾d.; Bordubi, 11½d.; Chubwa, 11¼d.; Lattakoojan, 11d.; Hoogrijan and Kharjan, 10¾d.; Muttrapore and Keyhung, 10½d. Dooars—Chuapara, 8½d.; Jiti, 8¼d. Travancore—Perriavurrai, 9½d.; Davera Shola, 9¼d.

The average for the entire sale was 8d. per lb., against 8⅜d. per lb. last year.

For the concluding sales previous to the Easter recess, importers of Ceylon brought forward 28,843 packages against 24,500 packages last year, total since January 1st amounting to 352,107 packages; 1908, 337,895 packages.

On the whole the sale passed off with a firm tone, last week's prices in most instances being fully maintained. The few very fine parcels of tippy Broken Orange Pekoe between 1s. to 1s. 3¼d. met with keen competition and were rather dearer; there was some irregularity for good medium brokens from 10d. to 11½d., which occasionally sold slightly easier. Good liquoring Pekoes within the range of 8½d. to 9½d. received strong support, but the demand for Orange Pekoes was rather less, orders for America not being so much in evidence. Fair medium leaf and broken grades were a steady market, while the commonest descriptions remained unchanged. Low-priced dusts and fannings were inclined to be easier.

The following satisfactory averages were obtained: Henfold, Sutton, Udaradella, 11¼d.; Kotiyagalla, 11d.; Brookside, Cranley, and Tillicoultry, 10¾d. The result for the whole sale was 8½d. against 7⅞d. per lb. a year ago.

The London Cocoa Market.

By The Editor.

I think that when I come to put down the prices realized by the various growths of cocoa since my last report it will be seen that they have, on the whole, been maintained. Grenadas are still easily first as regards being prime favourites, but following behind are "other West Indian," when the lots on offer are plump and bright. Jamaicas and those piles that are outwardly dull have not been doing so well in proportion, although the *break* may leave nothing to be desired, as they do not come up in outward appearance to exporters' requirements. The final goal for heavy buying during the last month and more has, of course, been America, where it is feared that a duty of 4 cents per lb. will be levied after the passing of the new duty. Buyers in the States therefore are drawing in all the available supplies they can in anticipation; the extra price this is causing, plus interest and warehouse dues, is evidently looked upon as still being less than the 18s. 8d. per cwt., or $4 (16s. 8d.) per 100 lb. that the new duty will cause them to pay.

Holders, therefore, of cocoa must push forward their produce with all speed and take market price, and a very good price too, if they want to make hay whilst the American sun is still shining, because once this demand is shut down the present competition cannot be expected to continue. From time to time we have heard rumours of a duty in Bahia. Now it is reported to have been put on—"clapped on"—as some put it, without any warning, so that considerably over 20,000 bags are stated to have had to pay the tax before being able to get cleared. The first we heard of the matter was that one shipper had to pay £36, *i.e.*, 720s. on 1,000 bags, and the receipt for same was stated to have been shown in London. The duty, if imposed therefore, must be a shade over 8⅝d. per bag, and possibly was put on in a hurry to include the heavy shipments about to leave for America. Those caught by it must have suffered severely.

Meanwhile St. Thomé, untroubled by such an imposition, has done well and sold heavily. The stock at Lisbon, according to the latest figures, was only 72,000 bags, against 156,000 bags last year. Planters and shippers will see great changes take place in the movements of tea, coffee, cocoa, and other produce if they are taxed under the new *régime* in America. The differential duty of 1 cent on direct versus indirect shipments of tea will especially cause a considerable diversion in the shipments of that article, and it behoves all of us to carefully note how it will affect the trade of this country or of firms run with English capital. America, the same as Germany and ourselves, seems likely to be called upon to pay heavier general taxes, and all three countries must see, and will see, no doubt, that their sons make the best of the agricultural and commercial advantages obtainable under the respective Governments, for someone has to find the money to pay the piper for the costly tunes that the general public seem determined to call for. I only hope the English concerns, and especially the individuals that go to form them, down to the smallest office or messenger boy, will bear this in mind, and put in their best work to make as much money as possible, so that we at least can pay for the extra warships and also the extra men needed to man them, without too much of a strain. When I was travelling in Venezuela I once asked my neighbour at the dining table why he carried a revolver. He replied, because others did. "Does anyone get shot?" I asked. "Oh, not often, was the answer, and then, maybe, by accident." If the Navy buys plenty of cocoa, well and good; I will not say that that is not an advantage, but if those who insist on a big Navy wish to claim that so many powder magazines are not likely to go off and cause trouble when they are not meant to do so, I am not going to agree with them.

To return to cocoa pure and simple. I find that the Board of Trade returns for March show a substantial increase in our deliveries for home consumption. During March only 3,386 tons were delivered against 1,838 tons last year and 1,380 tons in 1907, so that is a gain of 1,550 tons in a month. Can it be that this is due to the San Thomé dispute, or a fear of an increased duty? The three months' figures work out as follows:—

Raw Cocoa—	Landed.	Deld. H.C.	Exported.	Stock, Mar. 31.
Jan.-Mar., 1907—	7,478	4,426	1,386	3,748 tons
,, ,, 1908—	9,993	5,411	1,586	5,781 ,,
,, ,, 1909—	14,677	7,908	1,597	10,460 ,,
Increases	4,684	2,497	11	4,679 ,,

Havre stocks and values ran as follows at the end of March:—

	1909.	Value. Fcs.	1908.	Value. Fcs.
Pará ..	8,092	72 to 75	4,403	100 to 105
Bahia ..	17,847	72 ,, 78	15,122	97 ,, 105
Venezuela ..	26,006	70 ,, 150	20,994	97 ,, 160
Trinidad ..	27,133	73 ,, 76	28.885	98 ,, 105
Other W.I. ..	8,151	65 ,, 72	10.248	92 ,, 101
San Thomé ..	7,821	71 ,, 74	1,506	92 ,, 102
San Domingo	20,613	63 ,, 68	3,076	85 ,, 92
Haiti ..	11,502	54 ,, 67	11,532	80 ,, 96
Accra ..	15,195	64 ,, 67	9,406	94 ,, 98
Guayaquil ..	14,447	G'177 ,, 88	17,802	G'1110 ,, 122
Others ..	11,540			
Total	168,347 bags.		122,974 bags.	

Stocks in London on April 17th were :—

	1909.	1908.
Trinidads	14,229 ..	19,271 bags.
Grenadas	21,539 ..	15,369 ,,
Other W.I.	4,500 ..	3,808 ,,
Ceylons and Javas ..	18,886 ..	15,854 ,,
Guayaquils	12,967 ..	6,481 ,,
Brazils and Bahias ..	1,802 ..	1,254 ,,
Africans	25,337 ..	10,955 ,,
Other foreign	7,565 ..	6,355 ,,
Total	106,825 ..	79,347 bags.

Owing to the Easter holidays no public sales were held on April 13th, but for the week ending April 17th the following prices were ruling :—

Trinidads.—Fine marks ("La Compensacion)" are valued at 65s.; good middling to fine good red, 60s. to 63s. On April 20th La Compensacion realized 63s.

Grenadas.—Good to fine marks, 57s. to 59s. and 59s. 6d.; good fair to good red, 54s. to 56s.; ordinary unfermented to fair fermented, 50s. to 53s.

Jamaicas.—Good dull fermented, 54s. to 55s.; superior would still be worth 58s. to 60s; common unfermented sold down to 50s. or 51s.

St. Lucias.—Good to fine marks, 56s. to 58s. 6d.; fair to good fair, 52s. to 55s.; ordinary unfermented, 49s. to 51s. 6d.

Dominicas.—Good bright have sold up to 58s.; good fair at 51s.

Costa Rica.—Good reddish up to 57s. 6d.; ordinary and dull down to 52s.

San Thomé.—Has not been offered, though as can be seen the stock in London has greatly increased. German Cameroons, I hear, are being used instead.

Bahia.—Superior last sold at 59s. 6d., but those now offering are held for over 60s. ; fair are worth about 54s. or 55s.

West Coast Africa.—Well prepared and bright again sold up to 55s. and 55s. 6d., whilst ordinary to good fair washed realized 48s. to 52s. Up at Liverpool things are quieter, but the three months' business has been of a substantial character, 103,250 bags having been landed during that period, and 110,000 bags delivered.

Ceylon.—Have been freely offered and sold well. Fine, up to 83s.; fair to good medium and bold, 63s. to 77s.; "Native" good boldish, 58s. to 65s.; fair, 48s.

At the sales on April 20th, 15,600 bags of all growths were offered, including over 9,000 Grenadas. There was no export demand, and prices were easier. Where sales of Grenadas and "Other W. I." took place, fine marks showed a drop of 2s. In the absence of any export demand at the cocoa sales, the home trade were the only buyers, and at their own valuations were free bidders. What sold changed hands on the the basis of 53s. 6d. to 57s., and occasionally 57s. 6d. for fine Grenadas. This, as can be seen, marks a drop of 2s. per cwt. on fine Grenada. This absence of any export demand tends to confirm the report that Senator Aldrich's budget in the U.S. Senate is gaining support, and that portion of it which places tea, coffee, and cocoa on the free list as necessities of life, is likely to be adopted.

According to the London *Chamber of Commerce Journal*, a Burmese correspondent is asking for the names of importers of banana fibre, and a Swiss house wants the names of firms dealing in banana flour. The same authority maintains that a trade in agricultural machinery might be opened up in Angola by firms who understand what is wanted and issued catalogues in Portuguese.

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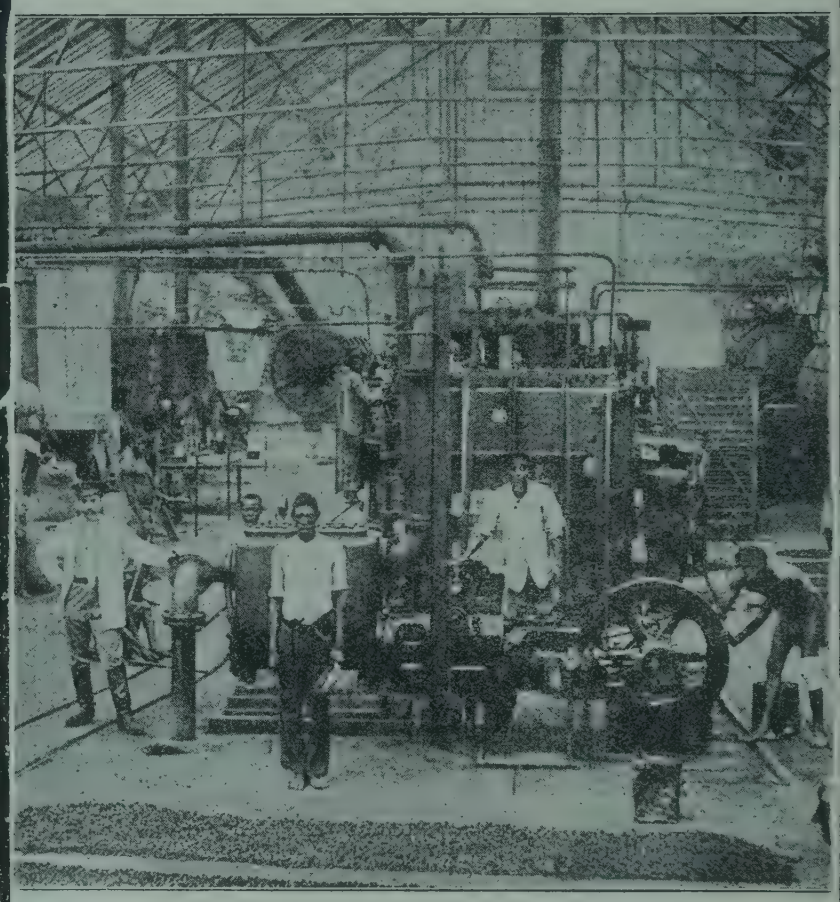

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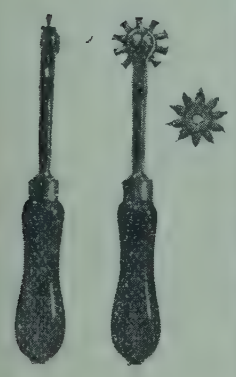

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The Fermentation of Cacao.

THE PRIZE FUND ALREADY AT £35.

The General Appeal still to be Made. Can we put your name down for £5?

THE following firms, hearing of the efforts we are making to improve the present methods of fermenting and otherwise preparing raw cacao, with their usual generosity at once responded to our appeal to subscribe £5 to the Prize Fund, and added their names to our list, thus bringing the total to the figure shown above:—

Messrs. Cadbury Bros., Ltd., Bourneville.
Messrs. J. S. Fry and Sons, Ltd., Bristol.
Messrs. Rowntree and Co., Ltd., York.
Messrs. Van Houten and Zoon, Holland.
Messrs. W. Van den Berg, Holland.
Messrs. J. H. de Bussy, Holland.
Die Indische Mercurer, and
The Editor of TROPICAL LIFE, London.

In face of the support already received, we therefore make a general appeal to the cacao manufacturers, our foreign contemporaries, and others interested in the production, shipment, or purchase of raw cacao. As we now show signs of far exceeding £50, we shall be pleased to entertain subscribers' suggestions as to whether a larger amount shall all go to the prize fund, or whether the balance remaining over the £50 be placed towards publishing the best and most useful essays in book form. Out of the £50 it has already been suggested that three prizes be made—namely, (1) £25; (2) £15; (3) £10—but the general idea is against such a proposal, so at present it would seem as if one prize only of £50 will be offered.

In case all our readers may not have seen the preliminary notice published in the April issue, we reprint the same.

"During the last twenty years several improvements have been introduced in the systems and methods employed to dry cacao, but as regards the fermentation planters still have much to learn. German and Dutch authorities have published accounts of their investigations in this line, and have added to the scientific knowledge of the subject. What we now require is to have a popular scientific treatise drawn up in English on the fermentation and drying of cacao; one that will fully explain the why, when, and where of the biological and other changes that take place in the beans, and show how these changes can, perhaps, be regulated, modified, and even entirely checked, so that the beans can be turned out 'to order' as regards colour and quality, on somewhat similar lines to what it has been found possible to do with rubber. Such a treatise will, we consider, encourage the planters to continue the experiments on a large scale, and by adapting the method or methods found to give the best results they will be able to assure an improvement in the quality, colour, appearance, and more even break of

their beans. It should also enable small peasant and other proprietors, as on the West Coast of Africa, in the West Indies and elsewhere, to turn out from numberless small plantations large bulked shipments of cacao, as similar in appearance as is the case with the exports from Bahia, San Thomé, the Gold Coast, &c., cacao that can be depended upon to turn out to type, and not show a marked difference in appearance in every few bags.

"In order, therefore, to encourage further research work on the lines stated, and to ascertain exactly what changes (together with their causes, and whether these changes occur during the fermenting process only, or whilst being dried) take place in the cacao bean between the time that it leaves the pods until it is shovelled into the bag for export, the Editor of TROPICAL LIFE has much pleasure in heading a list of donors of £5 each towards a prize fund for the best treatise on the subject, the said treatise to be competed for on terms as shall be agreed upon by the various subscribers as soon as the list is closed."

We have made the start, and a very good start too, thanks largely to help of our friends Messrs. De Bussy and Co., so now ask all our readers interested in the matter to add their names to the list. When, as some prefer, immediate payment is made, the amount is at once placed to a special account at the bank; but, if preferred, a guarantee form will be forwarded for signature and return.

Prospective competitors can at once make the preliminaries for a start. We shall probably settle down to business on July 1st—that is, after the appearance of our June number—and at present the idea is to have all papers sent in by December 31st, 1910, giving competitors eighteen months for their task. Dr. Van Hall, is, however, due home in June from Surinam, and has very kindly promised to arrange the terms on which the competition will be run.

The Proposed Bureau of Agriculture.

THE EDITOR OF "TROPICAL LIFE" BRINGS THE MATTER PERSONALLY BEFORE THE SECRETARY OF STATE FOR THE COLONIES.

REFERRING to our Editor's letter to the *Standard* asking for a Bureau of Tropical Agriculture, the Secretary of State for the Colonies, writes as follows:—

"SIR,—I am directed by the Earl of Crewe to acknowledge the receipt of your letter of the 13th inst., calling attention to the letter addressed by you to the Editor of the *Standard* with regard to the necessity for a Bureau of Agriculture in the Metropolis, which has been reproduced in the current issue of TROPICAL LIFE in an article entitled, 'Important Move in London for the Encouragement of Tropical Agriculture.'

"I am, Sir,

"Downing Street, "Your obedient servant,

"*April 20th*, 1909." "R. L. ANTROBUS.

Since then we had the advantage of a few minutes' conversation with Lord Crewe, at the Liberal Colonial Club dinner, when the Colonial Secretary expressed the view that one or other of the many excellent institutions which we have in London or elsewhere, such as Kew, the Imperial Institute, the Colonial Office Library, &c., covered the ground. Our contention was, however, that though the ground could be covered by these institutions, the public are quite unaware of the full value of them, and do not know of the books they contain, and, above all, of the useful monthly publications issued by them and our botanic stations throughout the Empire. What is absolutely necessary in order that these publications can be fully appreciated by the well-to-do paterfamilias, wishing to start his sons on an estate abroad, is to centralize the issuing and circulation of them, as is done at Washington. At the same time international statistics, &c., could be arranged and tabulated, showing possible and probable returns obtainable from the various crops. All this we pointed out to Lord Crewe, and later on sent for his inspection the Washington book of tea, coffee, and cacao statistics, and their last monthly list of publications.

The Economic Value of a School of Tropical Medicine.

This is the first of what we hope will be a long series of articles on the excellent work that the London School of Tropical Medicine is carrying on in the Tropics, in order to make life possible where it was impossible before, and to make it more certain where hitherto it has not been safe for Europeans to remain. No one can deny that such work is of the utmost importance if valuable colonial centres are to be developed, and useful lives saved. The trade of this country needs extending; we are told that we are already the heaviest taxed nation on earth, whilst it seems doubtful if we are the wealthiest.[1] *We hear a great deal about the necessity of "broadening the basis of taxation," but far too little about broadening the basis for earning the money out of which the taxation is to be obtained. This, however, is what* TROPICAL LIFE *and the London School of Tropical Medicine mean to do. "Lest we forget," therefore, who it is that is working so strenuously, so pluckily, but also so unobtrusively to enable the enterprising trader to fill his pockets, and the Government their coffers, this notice will appear so long as the articles are published.*

"Subscriptions are badly needed to enable those connected with the London School of Tropical Medecine to push on with their work. Every resident and visitor in the tropical zone benefits through this most necessary iustitution, we therefore hope that every reader of TROPICAL LIFE *will send a subscription or donation to enable the work to be further extended. Cheques or money orders can be sent to P. Michelli, Esq., C.M.G., Secretary, London School of Tropical Medecine, 'Dreadnought' Hospital, Greenwich, London, S.E., or, if preferred, to the Editor of* TROPICAL LIFE. *Acknowledgment will be made in this column for all amounts sent, no matter how small, if the sender will mention the name of this paper in his letter covering the remittance."*

IT is essential that disease should be prevented as much as possible, and that correct treatment should be adopted for medicine to be of economic value, especially when dealing with large bodies of men. In diseased conditions if the condition is not recognized at once and actively treated serious damage will be caused, and some permanent incapacity will result.

It is unnecessary in writing for practical planters to emphasize these points; but it is to show that successful results can be obtained in both lines by the application of our present knowledge in the case of many tropical diseases.

A further extension of medical knowledge will probably do the same for other diseases. For this research is required, and the staff of the London School of Tropical Medicine can undertake such work if funds are forthcoming. We, therefore, propose to publish a series of

---

[1] According to Mr. Barker, in the *Fortnightly Review*, Great Britain is taxed Mks. 95·80 per head, France 82·70, United States of America 80·80, and Germany (if correct) only Mks. 47·17. On the other hand, we are told that, there are only £210,000,000 in the United Kingdom Saving Banks, against £800,000,000 in the German Saving Banks, and the same in the American.

short articles in the future, showing the immense saving of life and money that has been effected already. Our official and mercantile readers can help to increase this by subscribing to the funds necessary to carry on the research work to-day.

Well-trained medical men are necessary. In England, in addition to a number of men whose work is entirely in preventive medicine, there is about one medical practitioner to every 200 or so of the population. Such a proportion in the Tropics is impracticable, as it would be too expensive; but for the necessary reforms, though it may be impracticable to have even one medical man for 1,000 of the population, that man should not only be a good man, well trained in ordinary medical work, but must have the special knowledge of tropical diseases, their detection, prevention and treatment, which he does not obtain in the ordinary medical curriculum. Without this special knowledge he will be ineffective, and therefore expensive.

One of the objects of the London School of Tropical Medicine is to provide training in this special branch for medical men going to the Tropics, whether in Government service, and in that capacity responsible for the health of native labour, or in the employ of private firms. During the last ten years some 950 medical men have received this special training, and have applied it in many instances with marked success, as indicated by the larger proportion of labour constantly at work, by the diminished death-rate, and by the smaller rate of invaliding. In some instances the improvement has been so gradual that the results compared from year to year, as the reforms have been effected, require careful analysis before their true import is seen. In other instances striking results are rapidly obtained, as in the case of malaria, the causation of which is perhaps better known than any other disease. This knowledge is only of the last ten years. Previous to that, only incomplete and inaccurate information was obtainable. Malaria was put down to night air, swamps, granite formation, decomposing vegetation, high temperature, and turning up of soil, and particularly of certain soils. Exceptions were known to all these, and that malaria could and did occur under other conditions, whilst it might not occur where all these factors existed.

The knowledge that certain species of mosquitoes carried malaria from man to man and that other species did not, explained how these varied factors influenced the prevalence of malaria, as they are all important in so far as they aid in the development and multiplication of the special mosquitoes which can carry malaria, and in no other way. The direct methods by which malaria can be mastered are well known. It is necessary for malaria to exist and spread.

(1) That man with malaria should be present.

(2) That the special malaria-carrying mosquitoes should be present and suck his blood.

(3) That after a time, varying with the temperature of the air from one to three weeks or more, this same mosquito should bite some other susceptible person.

This susceptible person, if he be bitten by a malaria-carrying mosquito which has been infected by biting a person with suitable parasites in his blood one to three weeks previously, will usually then develop malaria in ten days to a fortnight.

Malaria will not occur unless all these conditions are present. In the Tropics imported labour is so common that it is practically impossible to entirely prevent importation of persons with malaria. It is of importance for Europeans to live, as far as possible, from persons, such as gangs of labour, or native villages where infected persons are probably present.

The most successful results on a large scale have been obtained by dealing with the species of mosquitoes (Anophelines) capable of carrying malaria. Instances of this we propose to give in the next number.

Defence of the Empire.

THE COMING CONFERENCE.

THE EARL OF CREWE, Secretary of State for the Colonies, was the guest of the Liberal Colonial Club, at a dinner on May 6th at the Trocadero Restaurant. The Earl of Durham presided, and among an unusually large number of members and guests were Mr. H. J. Tennant, M.P., Parliamentary Secretary to the Board of Trade, and Mrs. Tennant; Mr. J. D. Rees, M.P., C.I.E.; Sir Charles Maclaren, M.P.; Mr. Munro-Ferguson, M.P.; Mr. E. T. Cook (Hon. Sec.); Sir Felix and Lady Schuster; Mr. H. H. Raphael, M.P.; Sir Richard Solomon, Agent-General for the Transvaal; the Editor of TROPICAL LIFE; and Mr. A. Cecil Beck, M.P., Treasurer of the Club (who made such a telling speech in support of the Hon. Sir Josiah Symon, K.C.M.G., K.C., at the meeting of Fellows of the Royal Colonial Institute to discuss the question of "Naval Defences" on April 26th).

Lord Crewe, speaking of Imperial defence, said he hoped and believed that the results of the enquiry now being held would be practical and useful. A subsidiary conference of the great Imperial Conference was to be held this summer. He was not prepared to say that the time was absolutely ripe for full and complete discussion of the whole of that question. For instance, it could hardly be expected that South Africa could speak with certainty on the subject till union had been carried out there. But, on the other hand, there were many incidents of importance. There had been the fine and soul-stirring offers from New Zealand and from Australia. There was the not less hearty movement towards Imperial defence in Canada, and all these things together entirely justified us in endeavouring to arrive at some at any rate provisional conclusions after talking the matter over in a friendly way. The nearer they could approach to a common organization in defence, the better for the Empire. Such things as an Imperial General Staff and a certain assimilation—though he would not say identity of organization—for purposes of defence of the system of the Mother Country, and the systems of the dominions were steps in the right direction. But at the same time he was equally convinced that local elasticity was not less necessary. We could not do anything more unwise than attempt to impose on the great self-governing dominions a scheme of defence of a kind unpalatable to them. In a sense each dominion must work out its own defence in its own way, but it was extremely important that the whole system should be coherent, and the parts if need be capable of being dovetailed.

HIGHLY polished rice, it is claimed, loses about 90 per cent. of the nitrogenous matter in the grain; Professor Knapp, according to the *Indian Review*, claims it is richer in fats than other kinds, and, therefore, has more flavour. It is also highly nutritious.

Fertilization of the Almond Tree.

By George A. Cowie, M.A., B.Sc.

Up to the present time comparatively little experimental work has been done in the investigation of the above subject, so that there is, unfortunately, not much available data on which to base conclusions; but the facts that are known are presented here for the consideration of the reader. The amount of plant food contained in the leaves and branches of the almond tree is practically immaterial for our purpose, as it is for the most part returned to the soil. What we must consider is the quantities of the important constituents that are withdrawn permanently from the soil through the medium of the fruit. According to the analysis of Zedeler, the almond contains :—

38·20 parts per 1,000 of nitrogen
13·70 ,, ,, ,, potash
21·40 ,, ,, ,, phosphoric acid
4·30 ,, ,, ,, lime

A tree, therefore, in full bearing, which yields annually 45 lb. of almonds (without husks), will remove annually from the soil :—

1·68 lb. nitrogen
0·60 ,, potash
0·94 ,, phosphoric acid
0·19 ,, lime.

Assuming, now, there are forty trees to the acre, we find that the quantities of the important fertilizing ingredients removed per acre from the soil by the corresponding crop of almonds (1,800 lb.) are :—

67·2 lb. nitrogen
24·0 ,, potash
37·6 ,, phosphoric acid
7·6 ,, lime

From these figures it is plainly evident, if the almond tree is to maintain its prolificacy, that the soil must be replenished with the proper amount of plant food. How is this to be accomplished? In the first place it will be necessary to find an economic method of supplying nitrogen, for it would prove too costly to apply this constituent all in the form of chemical manures. From the figures given above, there would be necessary for this purpose no less a quantity of nitrate of soda than $3\frac{3}{4}$ cwt. per acre. It is preferable, therefore, to have recourse to green manuring, and to supplement this with small quantities of nitrate of soda or sulphate of ammonia.

On calcareous soils, or soils which are not poor in lime, sainfoin should be cultivated every third, fourth, or fifth year, and ploughed in at the time of flowering. This will supply with roots, stems, &c., at least 180 to 220 lb. nitrogen per acre, corresponding to 10,000 to 13,000 lb. green plant material. This manuring, along with an application of 2 to $2\frac{1}{2}$ lb. nitrate of soda or sulphate of ammonia per tree, will provide sufficient nitrogen.

No Manure. Fully Manured with Nitrogen, Potash and Phosphoric Acid.

Manuring Experiment on Almond Trees by Mr. Emilio Albiach, Alicante, Spain.

On sandy soils it is advisable to grow lupines every second or third year. This crop, buried in the green condition, will supply 130 lb. nitrogen per acre, or 13,000 lb. green material. In the case of many sandy soils, or sandy loams, the better plant is bird's-foot (*Ornithopus*), which will supply 10,000 lb. green material, equivalent to 120 lb. nitrogen per acre. It is recommended to cultivate this crop every alternate year. In the same way many other leguminous crops may be grown for the purpose of enriching the soil with nitrogen, but at the same time it will be found advantageous to supplement this method by the application of artificial nitrogenous manures at the rate indicated above.

Referring again to the figures at the beginning, we find that each almond tree requires yearly 0·60 lb. potash, or forty trees (occupying 1 acre) 24·0 lb. To restore this constituent to the soil, one of the three following salts should be applied and at the rate suggested :—

	Per tree	Per acre (40 trees)
Sulphate of potash	1½ lb.	60 lb.
Muriate of potash	,,	,,
Kainit	6 lb.	240 lb.

The sulphate of potash should be employed preferably on the heavy soils deficient in lime, while the muriate is to be reserved for those containing sufficient lime and kainit for the sandy soils.

With regard to phosphoric acid, we observe that each tree is responsible for an annual loss of 0·94 lb., or forty trees (occupying 1 acre) 37·6 lb. It will therefore be necessary to use the following quantity of one or other of the phosphatic manures :—

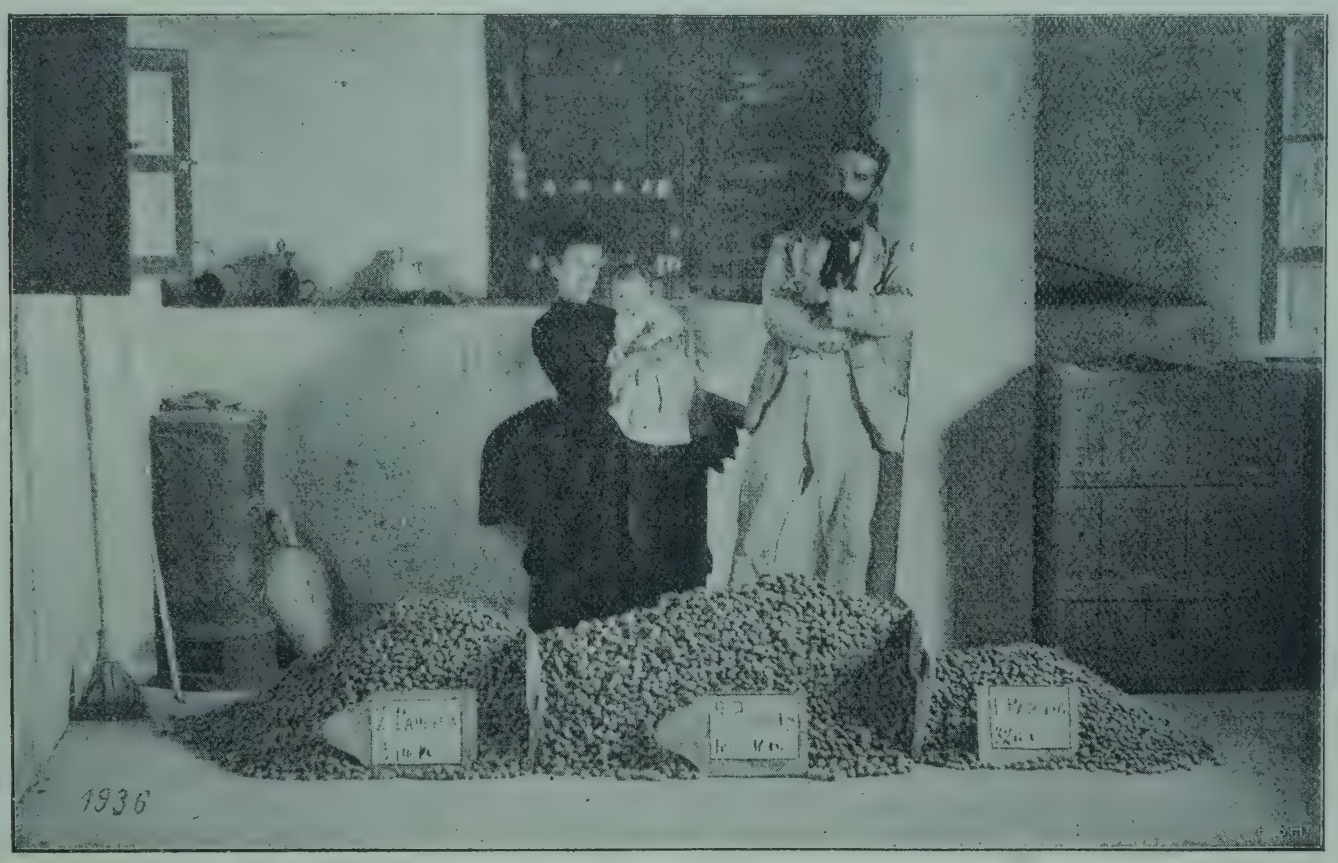
	Per tree	Per acre (40 trees)
Superphosphate (18-20)	5 lb.	200 lb.
Basic slag (15-17)	6 ,,	240 ,,

In cases where the soil is well supplied with lime, it is recommended to use superphosphate, and basic slag wherever there is a deficiency of this constituent.

As a summary of the foregoing remarks, the following manurial prescriptions, in addition to green manuring, may be laid down for the different classes of soil.

(1) Heavy Soils Deficient in Lime.

	Per tree
Basic slag	6 lb.
Sulphate of potash	1½ ,,
Sulphate of ammonia	2 ,,



	Manured without Potash. lb. per acre.	Fully Manured. lb. per acre.	No Manure. lb. per acre.
Superphosphate	330	330	—
Nitrate of Soda	80	80	—
Sulphate of Ammonia	80	80	—
Kainit	—	450	—
Yield of Almonds per acre	975 lb.	1,532 lb.	433 lb.
Profit per acre due to Manuring	£2 13s.	£6 8s.	—

Manuring Experiment on Almond Trees by Mr. Emilio Albiach, Alicante, Spain.
(Photograph representing yields from the different plots).

(2) Heavy Soils Containing Sufficient Lime.

	Per tree
Superphosphate	5 lb.
Muriate of potash	1½ ,,
Nitrate of soda	2½ ,,

(3) Sandy Soils.

	Per tree
Basic slag	6 lb.
Kainit	6 ,,
Sulphate of ammonia	2 ,,

These manurial recipes, of course, apply only to trees which are in full bearing. In the case of younger trees and trees planted more closely together, the quantities of the different manures for application per

tree will have to be lessened and calculated in the same way according to the yield per acre.

The above calculations were also made on the assumption that the soil on which the almond trees are cultivated is naturally poor. If the soil be fertile, however, it is clear that the quantities of the manures may be correspondingly reduced. It is impossible here to enter into details, but it may be stated generally that the best and surest method of determining the requirements of a soil is to carry out suitable experiments upon it.

While the phosphatic and potassic manures should be applied and ploughed in in the autumn or at the beginning of the winter, the nitrate of soda and sulphate of ammonia will be more advantageously applied in the spring and incorporated with the surface soil. In soils which contain an abundance of lime, good effects will be produced by the use of iron sulphate applied at the rate of 40 to 70 lb. per acre.

In order to show finally the actual advantages that may be obtained in practice by the judicious manuring of the almond trees, we may quote the results of an experiment carried out in 1907-08 by Mr. Emilio Albiach in Alicante, Spain. The trees, which were 20 to 25 years old at the time of the experiment, had been previously manured merely with the ashes of the husks. Three plots in all were taken, and while one was left unmanured, and another received superphospate, 330 lb. per acre, nitrate of soda and sulphate of ammonia each 80 lb. per acre, the other plot got the same quantities of the latter materials, and in addition a dressing of kainit at the rate of 450 lb. per acre, *i.e.*, a "complete manuring." The superphosphate, sulphate of ammonia, and kainit were sprinkled round the base of the trees on December 5, 1907, and the nitrate of soda in the following spring—one half in March and the other half in May. The harvest took place on August 28, 1908, and the results may be represented as follows:—

Manuring per acre	Yield per acre	Increase in yield per acre over unmanured	Value of increase in yield per acre over unmanured—cost of manures or actual profit per acre due to manuring
	lb.	lb.	£ s. d.
(1) *Unmanured*	433	—	—
(2) *Incomplete manuring* (without potash) 330 lb. superphosphate 80 ,, nitrate of soda 80 ,, sulphate of ammonia	975	542	2 13 0
(3) *Complete manuring* 330 lb. superphosphate 80 ,, nitrate of soda 80 ,, sulphate of ammonia 450 lb. kainit	1,532	1,099	6 8 0

Comment on these results is needless. They testify clearly enough to the practical importance of restoring to the soil in the cultivation of the almond the three chief elements of plant-food—nitrogen, phosphoric acid, and potash.

TYPEWRITER (Lady), good at Spanish and correspondence, some experience with technical rubber translation, wishes to obtain employment. Has no objection to go to Latin America if desired, either alone or with brother.—Apply, EDITOR, *T. L.*

An Up-to-date Rotary Dryer.

IN the December (1907) issue we drew attention to a rotary dryer that our editor designed to overcome the difficulties experienced by many planters to satisfactorily dry their cacao without scorching it. Since then several alterations and improvements have been introduced, and the capacity largely increased to suit the wishes and requirements of the big planters and others interested in it, not only for cacao, but for coprah and coffee as well.

In order to economize every inch of space available within the drum the largest dryers are, as shown in the accompanying design, now made with six large cylinders instead of the twelve smaller ones as shown in the 1907 design. It will be noted that now each cylinder contains three sloping ledges or narrow shelves which check the fall of the beans, and by dropping them gently towards the next ledge allows the moisture to escape and the air to circulate freely through the beans. The cylinders, thanks to the lifting arrangement and runners that we have introduced, can now be made up to any capacity, though we do not recommend a greater diameter than 2 ft. 6 in., or at the most 3 ft., for though the drum containing the cylinder revolves very slowly (only just fast enough to avoid scorching) a larger circumference would give too long a drop for the beans, and would also cause too heavy a bulk to be falling over those below, and tend to crush and damage them, especially at first when the skin or shell is soft and delicate. On the other hand the cylinders can be made any length, so that the six cylinders will hold 10,000 lb. wet cacao, to turn out about half that quantity when dry. Opinions, even of the experts, vary considerably as to what space should be allowed per 1,000 lb. of wet cacao to be dried, and whether the cylinders can be two-thirds or only half full. No two enquiries agree on these points either as regards cacao, coffee, or coprah. We therefore suggest that all those interested in the machine, and wishing to have particulars as to price, &c., must state what space they wish to be allowed per 100 or 1,000 lb. wet cocoa to be dried at a time, and must make allowance themselves when they receive the dryer as to how they will charge the cylinders. In a word, they must say what size cylinders they desire, for since ideas differ so much on the point we cannot undertake to satisfy everyone.

The motive power can be supplied by hand in the case of the smaller machines, and by means of steam, gas, or oil engine, or with bullock, electric or windmill power with the large ones. The gear is so regulated that the drum cannot be turned so fast as to crack and break the beans. Quotations supplied so far have ranged up to a 10,000-lb. capacity dryer. As a rule we would advise buyers connected with large estates to take two machines, each to hold 5,000 lb. wet cacao, rather than one machine with 10,000 lb. capacity. The reasons for this are obvious, you can work the two easier in many ways. When the crop is small economy is assured by working only the one smaller machine, instead of the big one which consumes more fuel. Again, in case of a hitch in the machine, having the two dryers on the premises instead of only one, the work is not brought to a standstill until the trouble is surmounted. When buyers are able to build their own stoves, and many seem able to do so, the drum and cylinders only, but including the damper, &c., can be ordered, at a considerable saving in the first cost, as well as for packing, freight and transport.

Another enquiry was as to whether the machine was suitable for drying ground-nut kernels (Arachis hypogœa). These of course also need the inside red husk or skin removed, and about 5 per cent. to 6 per cent. water extracted. The great point is to get the nuts to remain white and not allow them to turn brownish. Our answer was to the effect that our dryer would do the work as well as, if not better than, any other make, only the wooden ledges should be wider than with cacao, and four ledges might be better than three as shown in the drawing. The reason for widening and perhaps increasing the number of the shelves is that the ground-nut kernels, as stated above, must have the red skin removed, whereas with cacao you not only do not want to remove the skin or husk, but, if possible, you do not even want to crack it. Again ground-nuts are small and pack close; the wider shelves would throw them about more, and so let the air circulate more freely between them.

Experiments are being carried on to test the ability of the machine to dry bananas.

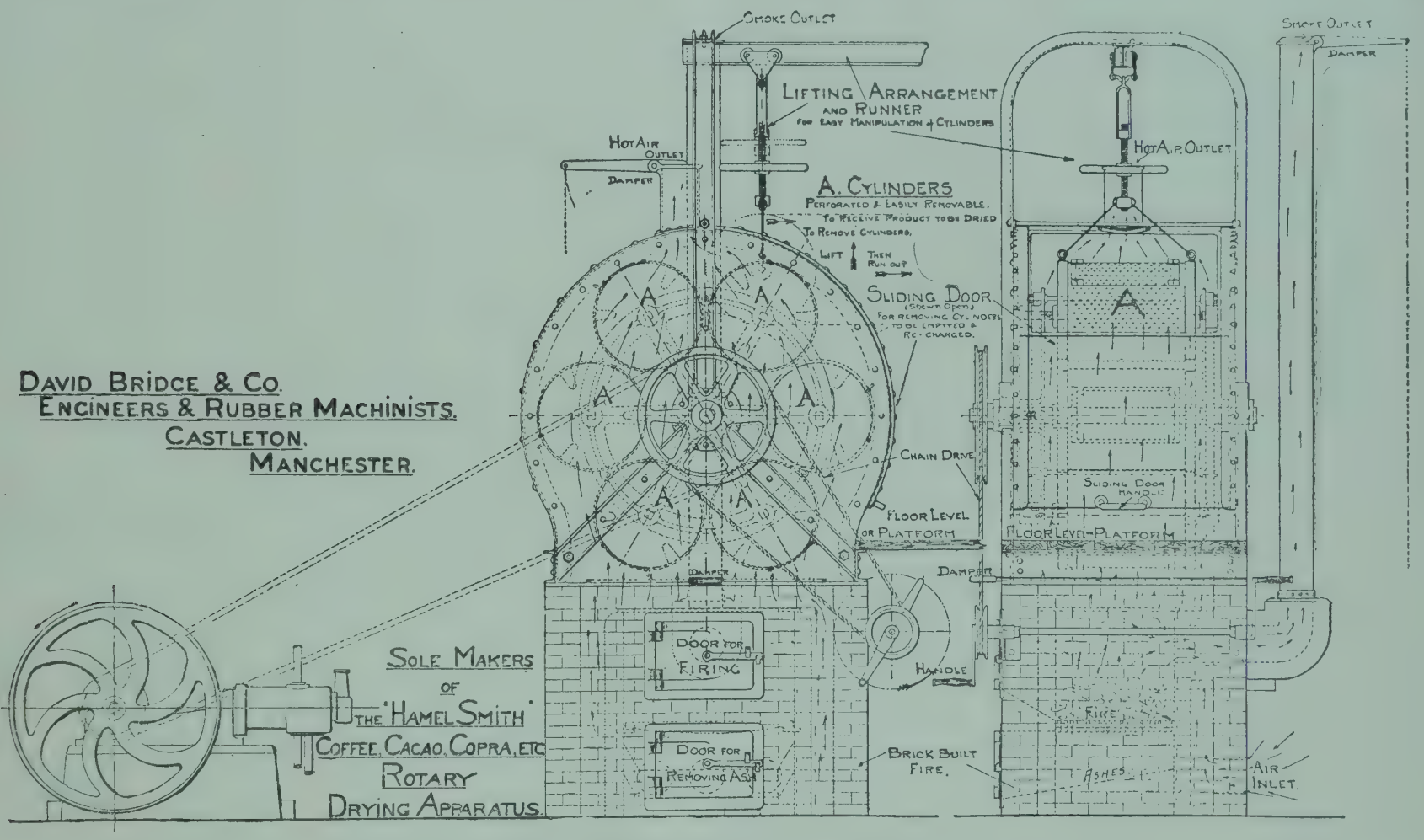
We claim that there is less liability to scorch with this machine than with any other, or with cacao of cracking the shell whilst being dried.

In view of recent investigations into the biological and oxydizing changes brought about during the sweating, and the sweating-cum-drying processes, this dryer if properly handled should also give the best and most reliable results as regards colour and aroma of the beans drying.

The machine as now adapted can equally serve for coffee, coprah, &c. In the January (1909) issue particulars are given of the favourable report by the Philippine authorities on using a rotary dryer for coprah drying. Compared with other processes mentioned, the time a rotary dryer takes to extract the moisure is ridiculously small, viz.:—

Method.	Time.
Sun	5 days.
Grill (over bamboos)	10 to 12 hours.
Hot-air chamber	3½ ,, 4 ,,
Rotary hot-air process ...	2 ,, 3 ,,

The rotary apparatus, claims Mr. Walker, the Philippine writer, since it lends itself to a continuous process and requires considerably less time, specially recommends itself for drying coprah. The crude local-made machine in use in the Philippines did not keep the nuts as clean as the shelf-dried coprah was, but with the machine under review, no difference, but even an advantage, is expected not only as regards the colour, but also the taste and smell of the nuts.



THE HAMEL-SMITH ROTARY DRYER.
LARGE SIZE COUPLED TO OIL-ENGINE FOR SUPPLYING POWER.

Experiments have been carried out in Bahia during the past few years in connection with the drying of cacao by artificial heat. The results obtained from this system have been very encouraging, and had a rotary machine been used, they would have been still more favourable. It has been found that the artificial heat dries the beans more thoroughly than does exposure to the sun, and that the cacao thus artificially dried—locally known as "estufa" cacao—fetches higher prices in the Bahia market than does the sun-dried article, by reason of its superior and more regular colour. The system, however, has been adopted to only a very limited extent, owing to the comparatively heavy cost entailed in the construction of suitable "estufas" or stoves. At the present time there do not exist, probably, more than a dozen such stoves all told throughout the entire cacao-growing area (see also paragraph at foot of page 77).

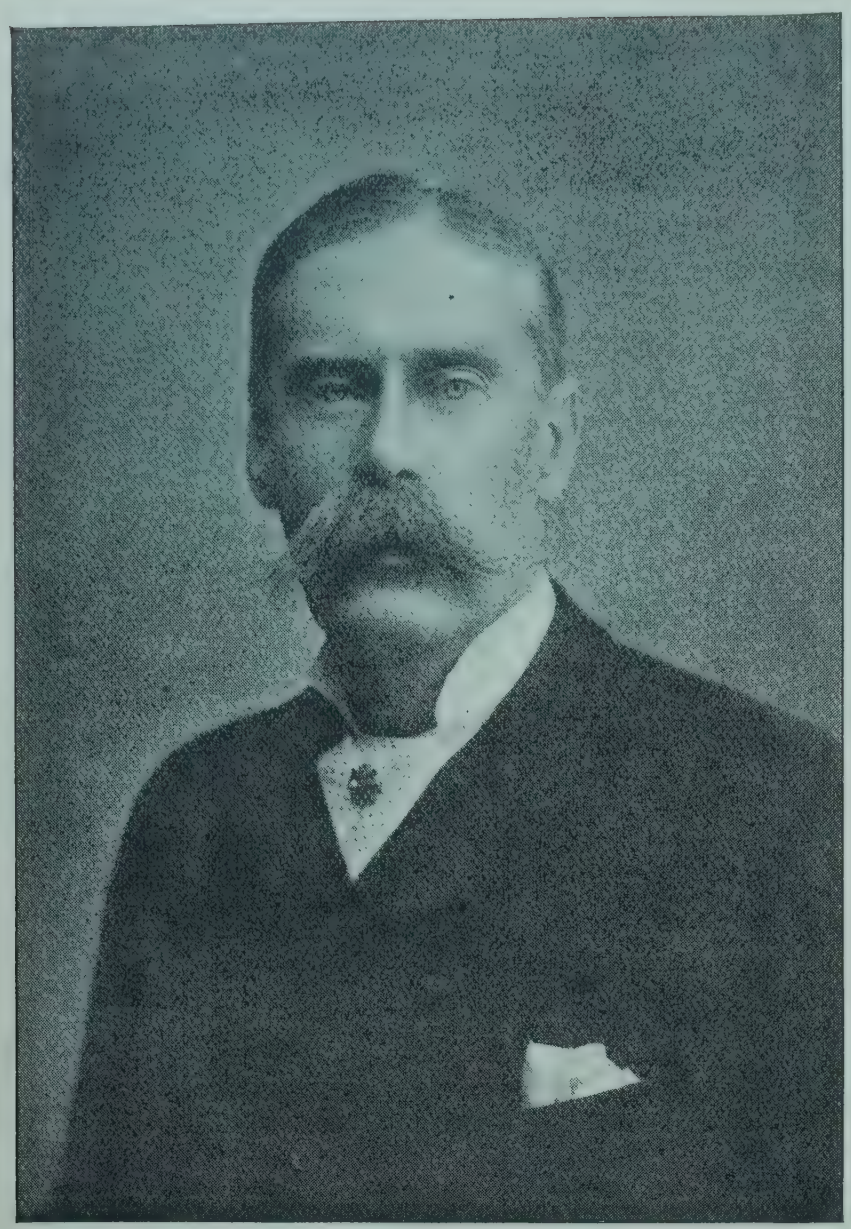


Photo by Alfred Ellis and Walery.]

"Tropical Life" Friend.—No. 47.

Mr. J. S. O'Halloran, C.M.G.

Secretary of the Royal Colonial Institute.

The subject of our sketch is, of course, known to most of our readers, for every one interested in colonial matters, even if not a Fellow of the Institute (which he should be), has probably attended one or more of its important meetings and heard papers on colonial and tropical matters read and discussed by the leading authorities of the day.

Born in South Australia, in 1842, "Our Friend" entered the Civil Service, and after filling several posts became, in 1870, Private Secretary to Sir James Fergusson, who was then Governor of the Colony. Mr. O'Halloran was elected a Fellow of the Royal Colonial Institute in 1872, undertook the duties of Assistant Secretary in 1881, being appointed Secretary in 1884, and has been so closely connected with the Institute that in giving an account of the latter we can best show the useful work that "Our Friend" has been engaged in for nearly thirty years.

A meeting was held at Willis's Rooms on June 26th, 1868, under the presidency of Viscount Bury, to promote the formation of a Society which should assume, in relation to the Colonies, a position similar to that filled by the Royal Society as regards Science, and the Royal Geographical Society as regards Geography. As a result a second meeting was held on August 12th, when the "Colonial Society" came into existence by the adoption of rules for its government and by the election of its first President and Council.

A deputation of the Council then waited upon the Duke of Buckingham and Chandos (Secretary of State for the Colonies), and Sir Stafford Northcote (Secretary of State for India), with the object of obtaining their official sanction and support, which was most readily conceded. Those Ministers undertook that the Governors of the several Colonies should be addressed in favour of the Institute, which undertaking was carried into effect by their successors in office (Earl Granville and the Duke of Argyll). As a result of this action, a large number of valuable works illustrative of the resources and progress of the Colonies and India have been added to the library, and for some years past full particulars of the constitution and objects of the Institute have been published in the Colonial Office List, "on account of the importance of the subject to Colonists generally."

On March 10, 1869, the inaugural dinner was attended by the Prime Minister (Mr. Gladstone), the Secretary of State for the Colonies (Earl Granville) and many other distinguished guests, and was regarded as a most successful demonstration in favour of the Colonies and the unity of the Empire.

In June, 1869, the prefix of the word "Royal" was graciously sanctioned by Her Majesty the Queen. Inconvenience arising from the similarity of the initial letters to those of the Royal College of Surgeons, the name of the Society was, by the vote of a general meeting on March 7, 1870, changed to the Royal Colonial Institute.

In July, 1871, the Duke of Manchester was elected President, in succession to Viscount Bury, who retired, and in June, 1878, the Prince of Wales was pleased to accept that office, the Duke of Manchester maintaining his connection with the Institute as one of its Vice-Presidents and Chairman of the Council up to the time of his death in 1890. On his accession to the throne in 1901, the King became Patron, and he was succeeded in the office of President by H.R.H. the Prince of Wales. The first Honorary Secretary was Mr. A. R. Roche. He resigned in 1871, and was succeeded by Mr. C. W. Eddy, who devoted himself to the interests of the Institute until his sudden death in 1874. At the request of the Council, Mr. (now Sir) Frederick Young undertook the duties of Honorary Secretary, and held that office until his election as a Vice-President in 1886; he was assisted by Mr. F. P. de Labillière—another member of the Council—from 1874 to 1881. Mr. J. S. O'Halloran was appointed Assistant Secretary in 1881 and Secretary in 1884, which office he still holds. Sir William Sargeaunt filled the position of Honorary Treasurer from the foundation of the Institute until a short time before his death in 1888, and was succeeded by Captain (now Sir) Montagu F. Ommanney, the present Honorary Treasurer.

In September, 1882, Her Majesty the Queen granted to the Institute a Royal Charter of Incorporation, with perpetual succession and a common seal, in recognition of the fact that since its establishment it had "sedulously pursued the objects for which it was founded," and with a desire of "encouraging a design so laudable and salutary."

In 1883 the lease of a site in Northumberland Avenue—the freehold of which has since been purchased—was secured, and, after a total expenditure of £50,000, the present substantial and commodious building was occupied in 1885. It contains an admirable library and affords a convenient place of meeting for Colonists,

Business Notices.

1.—The address of Tropical Life is Messrs. Bale, Sons and Danielsson, Ltd., 83-91, Great Titchfield Street, London, W.

2.—All **literary communications** should be addressed **to the Editor,** and accompanied by the necessary stamps for their return if not accepted.

3.—All **business communications and payments**, either for subscriptions or advertisements, should be sent **to the Publishers** of Tropical Life. Cheques to be crossed The Union Bank of London, Ltd.

4.—The Subscription, which is **Ten Shillings** per annum, may commence at any time, and is payable in advance.

5.—The Advertisement Department is at 112, Fenchurch Street, E.C., where all enquiries respecting advertisements, charges, &c., should be addressed to the Manager of the Department.

6.—Changes of address should be promptly notified.

7.—Non-receipt of copies of the Journal should be notified to the Publishers.

8.—The Journal will be issued on or about the twentieth of the month.

Tropical Life.

May, 1909.

The Application of Nitrogen to the Sugar Cane.

There can be no question that the old system of exhausting the soil by growing cane year after year (and often the same variety of cane) and neglecting to return to the land those plant food constituents which have necessarily been removed in large quantities, has frequently been responsible for poor crops and a consequent decrease in profits. No soil is rich enough to stand such a system for any length of time, and there is moreover no excuse for it in these enlightened days. No man would be foolish enough to allow machinery to get worn out for want of proper lubrication, nor would he expect an engine to do its work on an insufficient supply of the proper fuel. If only these principles were applied to the cultivation of the soil, we should hear very little about poor crops and exhausted land.

It stands to reason that the main object of the planter is to produce as much sugar as he can from his crop. The more successful he is in this, the more certain it is that his crop will consume a large amount of nitrogen, potash, and phosphoric acid, these being the three main constituents of plant food. It therefore follows that the vast quantities of these three essentials which are withdrawn by the crop must be systematically replaced if soil fertility is to be kept up.

While it will be found necessary in almost every case to supply some potash and phosphates, more often than not a considerable quantity of both the phosphoric acid and potash contained in the stripped cane is returned to the soil in the form of begasse ash, so that less has to be supplied in artificial form.

With regard to nitrogen it has been found that nitrate of soda and other nitrogenous manures exert a very favourable influence upon the yield of the sugar cane—in fact it has been authoritatively stated that "Nitrogen is without doubt the manurial constituent, the supply of which governs the yield of the plant." Again, the same authority states that "The effect of nitrogenous manurings appears to somewhat retard the maturation of the canes, and thus the juice of the canes manured with them is, as a rule, not so rich in saccharose as is that of canes grown without manure. But this effect is far more than offset by the larger yields of produce resulting from the application of nitrogenous manures, and to the fact that the increases produced by the nitrogen are principally due to the development of the stalks in length and in bulk, and not to the abnormal increases in the amounts of tops and leaves, or the production of new shoots to the stool."[1]

Two points must first be considered with regard to the application of manure to the land. (1) It should be manured early with a suitable complete manure—*e.g.*, farmyard manure—so that, in the event of a drought in the early part of the year, the young plants may be better able to withstand its effects. (2) In the second portion of the year, when the cane stool has well developed its roots and is in a state of very active growth, a much more soluble and active manure is required than that used at an earlier period, so that the artificial manures should be carefully selected with this object in view.

This second manurial dressing should contain a fair amount of potash and phosphoric acid—a larger amount of the former than the latter being applied, unless that has been done in the original complete manure.

With regard to the nitrogenous manure, as remarked above, a soluble and active manure is required at this stage, and therefore nothing so good as nitrate of soda can be selected. It is extraordinarily quick in its action, being immediately "available" by the plants, and is easily applied if mixed with three or four times the amount of dry earth. It must be remembered, too, that far better results will be got by applying it in two or even three dressings of small quantities than in one big dressing. "Little and often" is a good motto in this case, and will more than repay the small cost of extra labour involved.

With regard to the quantities of nitrate of soda to be used, it has been truly said that any attempt to lay down hard and fast rules in manuring would be liable to do more harm than good, but a careful study of the results of manurial experiments on sugar cane leads to the conclusion that from 200 to 300 lb. of nitrate of soda per acre is the most profitable amount, and that it should be applied in two or even three dressings.

Some discrimination must be used in the case of potash and phosphates, for while under some conditions the greater proportion of these constituents taken up by the plants is directly returned to the soil, under other conditions practically the whole of the produce is removed from the land, and must therefore be replaced, more especially in the case of potash.

It is well to remember that it is quite easy to allow your soil to get into a "run-down" condition, and thus incapable of producing good crops. It is not so easy to rehabilitate it. It is comparatively a simple matter on the other hand to keep it in good condition by paying attention to three main points: (1) Careful and thorough preparation of the land; (2) systematic stirring of the soil; (3) the judicious use of manures with the object of replacing those elements of plant food of which the soil has been depleted. By these means the fertility of already productive land can be maintained and even increased, while more or less worn out and exhausted land may be brought back to its original state of fertility.

[1] Newlands, "Sugar." Price 25s. (New edition, just published, for Planters and Refiners.) Pp. 856, with many illustrations. Messrs. E. and F. N. Spon, Ltd., 57, Haymarket, London, and Messrs. Spon and Chamberlain, 123, Liberty Street, New York.

To show the advantages of adequately supplying the canes with the nourishment that they require one has only to turn to any of the comparative tables of yields at the various centres where this is done. An island that is not mentioned in the following table is Trinidad, West Indies. The returns from this centre would show up rather poorly alongside the returns from Hawaii or Java, though it need not be so. Her soil, though formerly very rich, has, we understand, been allowed to go back in places, so that the returns per acre compare unfavourably even with Barbados with its coral subsoil, which is a distinct disadvantage. Both for cacao and sugar Trinidad should be using many thousands of tons of fertilizers per annum more than she is doing. This lack of cultivation and manuring are the main causes of the disease in the cacao trees, and of the unremunerative returns from her sugar fields.

Brazil, according to Oakenfull,[1] is in quite as bad a state. "The soil and climate of Brazil," says that writer, "are better adapted to the production of sugar than that of any other country in the world, but the planters have taken advantage of the fertility of the soil to such an extent that the yield per acre is now in places only about 50 tons per hectare (2½ acres)." Compared with this the returns from other centres, according to official figures, are as follows:—

	Tons of cane per hectare (2½ acres)	Per cent. of sugar
Java, intense culture..	.. 80 ..	14 to 15·5
Hawaii ,, ,,	.. 82 ..	15 ,, 15·5
Egypt, with irrigation	.. 38·5 ..	11 ,, 13
Argentina ,,	.. 40 ..	11 ,, 12
Demerara	.. 62 ..	— ,, —
Louisiana	.. 50 ..	11 ,, 13
Cuba	.. 50 ..	13 ,, 15
Queensland	.. 46 ..	— ,, —
Sao Paulo	.. 50 ..	13 ,, 14·5
Campos (Rio) ..	.. 50 ..	14·5 ,, 15·5

The authorities in Brazil are warning the planters that "it is useless for men to embark in enterprises in that country who are not prepared to work on the most approved lines, and those who think that they can do so in Brazil by methods which so impoverish their farms are enemies to the Republic. On the other hand, sugar will pay well if all is not taken out of the soil and nothing put in."

In his lecture at the Society of Arts last month on the forest belt, along the head of the Amazon, on the eastern side of the Peruvian Andes, Mr. Enock,[2] who knows the country well, claimed that new lands there gave even a heavier yield of cane to the acre than did Java and Hawaii. If this is so, it shows how the land nearer the mouth of the Amazon, which was formerly quite as rich as that on the Peruvian "Montana," has gone back. When one remembers that sugar has been grown there since the discovery of Brazil, this exhaustion of the land is not surprising if manures have not regularly been applied. Reports tend to show that this most necessary operation has been conspicuous only by its absence.

A BIG oil-mill in Suva or Levuka would raise the price of coprah immensely, and enable the honest planter to get a fair price. Again Fiji wants, very badly, small hand machines for pulping and hulling coffee.—R. L. HOLME, Bua, Fiji.

[1] "Brazil in 1909," J. C. Oakenfull.

[2] Author of "Peru," and "The Andes and the Amazon." London: Fisher Unwin.

The Tea Duty Remains Unchanged

THANKS TO "TROPICAL LIFE" AND MR. STUART R. COPE.

WE noted with considerable satisfaction that those interested in keeping the Tea Duty as low as possible took timely warning from us to fight against the tendency of the Treasury to fill its coffers at the expense of the planting industry of India and Ceylon. That the campaign of the Anti-Tea-Duty League was so successful is in a great degree attributable, we believe, to the efforts of the Secretary, Mr. Stuart Cope, who issued column after column of cogent articles which did not fail to awaken the country at large to the iniquity of any increase in taxation on such a necessity of life as tea. That these articles must have come to the notice of the Chancellor of the Exchequer is obvious from the concise summary of the arguments which Mr. Lloyd George gave in the course of his Budget speech.

From every point of view it is satisfactory that no increase of the duty was imposed. The planting community would have been very badly hit, not only by the actual fall in prices that would have undoubtedly occurred, but also by the direct encouragement that would have been given to the importation of the lowest classes of tea which those anxious to put the industry on a more satisfactory basis have worked so hard to keep out of this country. In this respect we are particularly glad to see that Mr. Cope has drawn public attention to the desirability of encouraging a taste for sound Indian and Ceylon Teas.

Great credit must also be given to the clever way in which the Anti-Tea-Duty League's propaganda was spread abroad. The arrangements, which must have entailed an enormous amount of work, were carried out with undoubted satisfaction—we understand—to all concerned by Walter Cutting's Publicity Agency.

Reviews.

The Cultivation and Preparation of Para Rubber (Second Edition), by W. H. Johnson, F.L.S., ex-Director of Agriculture, Gold Coast Colony, and now Director of Agriculture, Mozambique Company, East Africa, Government Commissioner to Ceylon to study Rubber in 1902. With numerous plates and illustrations of the latest machinery, &c. Price 7s. 6d. net.

This book brings the matter of rubber planting up to date. It also touches on the labour question in the Far East, and foresees trouble where we have all along expected it, *i.e.*, in the Federated Malay States, obtaining in the future sufficient labour to carry on the work there satisfactorily. Already the demand for labour has caused wages to increase, and the cost of production to be raised. "If," adds the author with reason, "labour be scarce in the planting districts now, when only about 2,000,000 trees are in bearing, what will be the condition of affairs six years hence, when it is estimated that over 50,000,000 trees will have reached the productive age?" To our mind an extensive annual emigration of coolies from India must be arranged for, because India has more than she wants, and if the natives can go to, and do so well in, the West Indies and British Guiana, they should also benefit themselves and others by going to the Federated Malay States. It is of the utmost importance, if that centre is to develop its rubber-producing capabilities to the uttermost, that this question of an adequate labour supply be taken in hand without delay. It is much better to start with 1,000 emigrants a year, and increase gradually until the supply is equal to the demand, than to try to rush through 5,000 coolies or more in a year or two hence without the necessary organization, perhaps, to handle so large a number, and insufficient accommodation on the estates to receive them.

This, the second edition, includes the latest authentic information on the subject, and deals exhaustively with the preparation of the rubber and the machinery required on an estate, as well as with the cultivation, growth, and yield of the trees. "To better enable this to be effected," states the author in his preface, "all the principal works dealing with the subject have been consulted, among them being (of course) Tropical Life."

The first edition, which we are told was the first book published in the English language dealing exclusively with the cultivation and preparation of Pará rubber appeared in 1904. The present edition includes all the latest authentic information, and covers a far larger range of subjects of utility to those connected with the rubber industry. We are especially pleased to see the exhaustive chapters on modern machinery suitable for rubber estates. These being freely illustrated, give the fullest possible information regarding the various processes employed by the old stagers. Messrs. Francis, Shaw and Co.'s blocking presses, and the Da Costa and Olsson-Seffer coagulating plants of Messrs. David Bridge and Co., together with their press and vacuum dryers, are carefully described and illustrated, as are also the vacuum dryers of Mr. Emil Passburg and Geo. Scott and Co.

A series of tables are given on pp. 149, 151, showing the average yields. Adding these together, we find that, although an individual tree is stated to have given 25 lb. in a year, yet from fifty-three different estates, apparently in Ceylon and Malaya, 970,015 trees gave 1,603,231 lb., or an average yield of 1·66 lb. per tree a year. These totals are ours; Mr. Johnson gives the individual averages per estate, which should be closely studied.

Other chapters deal with the commercial value of the oil in Hevea seed, and another contains several sets of estimates of cost for establishing and maintaining Pará rubber estates in Ceylon and Malaya.

Sciences Biologiques et Colonisation, par Professeur Dr. E. de Wildeman. Pp. 38. (Brussels: Albert de Boeck, Succr., 265, Rue Royale).

Mons. de Wildeman in this book very appropriately quotes the following sentence from Jules Mélin's, "La Retour à la Terre": "La prospérité publique est semblable à un arbre: l'agriculture en est la racine, l'industrie et le commerce en sont les branches et les feuilles; si la racine vient à souffrir, les feuilles tombent, les branches se détachent et l'arbre meurt." The importance of agriculture, adds Mons. de Wildeman, could not be better described; for it is, as it should be, the basis of all colonial development. In the *brochure* under review our esteemed fellow-journalist shows the important part that agriculture plays in the prosperity of all Colonial possessions, and the extreme necessity of the would-be successful planter to study biology in all its branches, either in regard to tropical diseases, hygiene, insect, and fungus pests, manures, the question of soil exhaustion and fertilization, &c. "It is a source of pleasure to know," our own King told the assembly he addressed at Leeds University, "that you have provided also for the study of the theory and practice of agriculture, for I am convinced that the best possible results cannot be derived from the industry and natural ability of our farmers, unless they are properly instructed in the scientific aspect of their work." Mons. de Wildeman also shows the advantages that every planter can derive from a scientific, as well as a purely practical training, in matters agricultural.

It will be remembered that last year Mons. de Wildeman added a very useful book to those available for the tropical planter's library, "Les Plantes Tropicales de Grande Culture" (price frcs. 10). This included coffee, cacao, kola, vanilla, and bananas. Another volume of the same series on "Rubber-bearing Trees" is in the press, and a third on fibres and fats is being prepared.

To the Editor of Tropical Life.

Sir,—It may interest several of your readers to know that we shall be pleased to entertain proposals from reliable concerns with a good connection among estates to represent us for the sale of our fluids, and, when wanted, for the spraying machines to distribute same. As we have our own houses or direct agents in Australia, New Zealand, United States of America, Cape Colony, the Argentine, Germany, Russia, Uruguay, we shall not want applications from those centres, but from Brazil, India, the West Indies, West Africa, San Domingo, San Thomé, and in fact all centres not mentioned above, we shall be glad to receive letters from firms who can show that they will be of use to us and at the same time to themselves. Should any of the members or representatives of such firms be on this side we shall be very pleased to meet them by appointment.

Yours very truly,

Berkhamsted, England. Wm. Cooper and Nephews.

Cotton.

The following were the prices for Cotton in London on May 7th, according to Messrs. Slann and Davies:—

	Good Fair.	Good.	Fine.	Superfine.	Good 1908. (Compare)	Good 1907.	
	d. d.	d. d.	d. d.	d.	d. d.	d. d.	
Surat kinds* ...	$4\frac{3}{8}$ to $4\frac{3}{4}$	$4\frac{5}{8}$ to 5	$4\frac{7}{8}$ to $5\frac{5}{16}$	—	$4\frac{7}{16}$ to $4\frac{13}{16}$	$4\frac{5}{8}$ to $5\frac{11}{16}$	per lb.
Madras	$4\frac{3}{4}$ to 5	$4\frac{3}{8}$ to $5\frac{1}{4}$	—	—	$3\frac{7}{8}$ to $4\frac{15}{16}$	$4\frac{7}{8}$ to $5\frac{5}{8}$	—
Bengal	—	$4\frac{1}{4}$	$4\frac{1}{2}$	$4\frac{5}{8}$	$3\frac{9}{16}$	$3\frac{3}{4}$	—
Assam	—	$4\frac{1}{2}$	$6\frac{3}{8}$	$6\frac{7}{8}$	$4\frac{1}{4}$	$5\frac{1}{4}$	—
China	—	5	$5\frac{5}{8}$	6	$4\frac{3}{8}$	$5\frac{1}{8}$	—
West Indian ...	5	$5\frac{1}{4}$	$5\frac{3}{4}$	6	$6\frac{1}{2}$	$7\frac{1}{4}$	—
Sea Island	$6\frac{3}{4}$	9	13	15	$9\frac{1}{2}$	12	—
Australia	$5\frac{7}{8}$	$6\frac{1}{4}$	—	—	$6\frac{1}{2}$	$7\frac{3}{8}$	—

* Liverpool quotations.

The weather in parts of Texas is still said to be unsatisfactory, and with slight fluctuations, the market has hardened during the week, "Futures" closing 6 to 7 points dearer. The business in spot is only moderate, and the quotation for middling is now 5·58d. Manchester is quieter, with some difficulty in maintaining the advance recently established, despite the improvement in the price of silver. Full prices are being asked for East Indian, but buyers are holding off.

The import into Liverpool this week amounts to 22,917 bales; since September 1st, 3,672,990; same week last year, 25,966; last year's total, 3,198,394 bales. The estimated Sales amount to 48,000 bales. Middling American is quoted at 5·58d. per lb.; last year, 5·51d.; 1907, 6·78d.

The latest quotations of Americans for delivery, basis middling, any port, G.O.G., were:—

	May 7th.	Last Week.	Last Year.
	d.	d.	d.
May	5·43	5·37	$5·10\frac{1}{2}$
May—June	5·43	5·37	$5·10\frac{1}{2}$
June—July	5·49	$5·41\frac{1}{2}$	$5·08\frac{1}{2}$

Movement of American Cotton since September 1st:—

	1908-9.	1907-8.	1906-7.
Brought into sight	12,505,000	10,397,000	12,602,000
Exports from United States since September 1st—			
To Great Britain	3,149,000	2,666,000	3,498,000
To Continent, &c.	4,086,000	3,802,000	4,028,000
Total crop	—	11,571,966	13,510,982

Coffee.

By Messrs. C. M. and C. Woodhouse.

Since the date of our last report the tone has been slow, and at the close prices are decidedly easier. East India has been a dragging market, and the small quantities offered were disposed of with some difficulty at a decline of 1s. to 2s. per cwt. Costa Rica was again in good supply, the total sales amounting to 9,000 bags, but with the exception of a few fine lots prices were about 1s. per cwt. lower for the week. Other Central American descriptions were generally dull of sale at easier rates, but fine Vera Paz realized full prices. According to Messrs. Düüring and Zoon's circular, the stocks in the principal ports of Europe on May 1st show a decrease for the month of 251,000 bags against a decrease of 1,000 bags at the same time last year. The visible supplies on May 1st were 13,307,000 bags against 14,996,000 bags and 16,165,000 bags in the two previous years respectively, being a decrease for the month of 628,000 bags against a decrease of 463,000 bags for the same period of 1908. The market for "futures" opened weak on lower Continental and New York advices, and the price of September Santos declined to 31s. per cwt.; after some fluctuations the close is quiet, the latest quotation (May 6th) being 31s. $1\frac{1}{2}$d., a decline of 6d. per cwt. from last week. We quote:—

		1909. To-day.	April 29th.
London ..	Santos, Sept. delivery.	31s. $1\frac{1}{2}$d.	31s. $7\frac{1}{2}$d.
New York ..	No. 7 Rio ,,	6·00 cents	6·15 cents.
Hamburg ..	Santos ,,	$32\frac{3}{4}$ pf.	$33\frac{1}{4}$ pf.
Havre ..	Santos ,,	$42\frac{3}{4}$ francs	$43\frac{1}{4}$ francs.

The receipts at Rio and Santos from July 1st, 1908, to May 5th, 1909, were 11,679,000 bags against 9,595,000 bags and 17,614,000 bags in the two previous seasons respectively.

Sales include the following, viz.:—

East India.—1,750 bags, viz.:—

Mysore.—47s. to 55s. for smalls, 52s. 6d. to 58s. for low middling to good middling, 57s. 6d. to 65s. 6d. for good middling bold.

Coorg.—44s. for smalls, 51s. to 52s. for low middling, 56s. 6d. to 57s. for bold.

Neilgherry, &c.—45s. 6d. to 53s. 6d. for smalls, 57s. 6d. to 59s. for low middling to good middling, 56s. 6d. to 70s. for middling to good middling bold.

Nelliampathy.—46s. 6d. for smalls, 52s. for middling.

Naidoobatum.—47s. 6d. to 57s. for smalls, 54s. to 61s. 6d. for middling to good middling, 64s. to 67s. 6d. for good middling bold, 78s. to 85s. 6d. for extra bold.

Nyasaland.—13 bags at 52s. 6d. per cwt.

Jamaica.—305 barrels and bags, at 37s. 6d. to 43s. for smalls, 45s. 6d. to 53s. for fine fine ordinary to low middling, 57s. to 73s. for good middling to good middling bold.

Costa Rica.—9,000 bags, at 40s. 6d. to 64s. for ordinary to fine smalls, 47s. to 61s. for fine ordinary to middling, 63s. 6d. to 75s. for good to fine middling, 62s. 6d. to 69s. 6d. for middling to good middling bold, 72s. to 90s. 6d. for good to fine bold.

Guatemala.—320 bags, at 46s. to 47s. for smalls, 50s. to 54s. for middling to good middling, 55s. 6d. to 59s. 6d. for middling to good middling bold, 101s. 6d. for Maragogipe.

Salvador.—870 bags, at 45s. for smalls, 48s. to 54s. 6d. for low middling to good middling, 51s. 6d. to 58s. 6d. for low middling to good middling bold, 87s. 6d. for Maragogipe.

Nicaragua.—670 bags, at 42s. 6d. to 43s. for fine ordinary foxy green, 46s. for smalls, 51s. to 52s. 6d. for middling to good middling, 66s. for good bold.

Vera Paz, &c.—950 bags, at 45s. 6d. to 47s. for smalls, 51s. to 60s. for low middling to middling, 64s. to 86s. 6d. for good to fine middling, 62s. to 63s. for middling to good middling bold, 76s. to 110s. for good to very fine bold.

Mexican.—745 bags, at 46s. to 49s. for smalls, 51s. to 56s. for middling to good middling, 58s. 6d. to 65s. for middling to good bold.

Colombian, &c.—365 bags, at 48s. to 53s. for low middling to good middling, 56s. to 58s. for bold.

Rubber Shares.

The Rubber Share Market has been much excited this month, though not more so than the public who are interested in them. "Good morning, have you used Pears' Soap?" has been changed temporarily into "Good morning, what has made the rubber share market jump up so?" Messrs. Russell, Grant & Co. in their circular of May 13th reported that: "The market for Malay and Ceylon Rubber Company shares continues its upward course, and every day shows signs of increasing vitality. More people seem to be attracted into this market, and business is becoming more general. Nearly all the shares quoted in the Lists have been dealt in very freely at very close prices."

For the sake of comparison the following are given. The names are not picked out, but are simply down as we happened to have the prices by us for both dates: they show the rise in the three months, but others may show even greater increases in price.

	February 12th	May 13th
Bukit Rajah	5¼ ..	7¾
Cicely Estates Co.	6⅜ ..	8⅜
Highlands and Lowlands ..	14/- to 15/- p. ..	28/- to 29/- p.
Klanang Produce Co. ..	3⅝ ..	4½
Lanadron Estates	7/6 to 8/6 p. ..	21/6 p.
Linggi Plantations ..	12/- to 12/6 ..	20/3
Perak Rubber Co.	22/6 ..	35/-
Selangor Rubber Co. ..	18/6 ..	27/- to 28/6
Shelford Rubber Co. ..	14/- ..	20/-
United Serdang Rubber Co.	32/- ..	46/7
Vallambrosa Rubber Co. ..	15/7½ ..	22/6

p. = premium.

The few artificial cacao dryers to be met with in Bahia all belong to the wealthier cultivators in the Ilheos and Belmonte districts.

According to Oscar Loew,[1] dryers provided with rotary cylinders through which warm air passes, are better for drying coffee than by merely exposing the beans in the sun.

Sun-dried coprah, Mr. Wilson Main[1] tells you, is only partially dried, and as soon as put in bulk becomes mouldy and rots. That said to be kiln-dried is practically roasted.

[1] *Tropical Agriculturist.*

The World's Travel, Sports and Tropical Exhibition.

Olympia's Great July Show.

Town dwellers doomed to live their lives in cities will be able during July at Olympia to rub shoulders with mighty hunters, and even accompany them on cinematograph journeys through jungle and wild mountain passes, witnessing big game fall to the sportsman's gun. For such intrepid travellers as Lord Lonsdale, Sir Henry Seton-Karr, Mr. Harry De Windt, Captain C. E. Radclyffe, and Captain G. Jackson will, at the Travel and Sports Exhibition, loan the priceless treasures of the chase which each gentleman has spent so many years of his life in acquiring.

The object of the display is to illustrate every form of sport, pastime, and travel in all parts of the world. Captain C. E. Radclyffe alone is lending a collection of hunting trophies insured for over £10,000, and he will lend a stuffed elephant and tiger shown in the attitude of the deadly fight which cost them their lives. To be thoroughly up-to-date, aeroplanes will be on view—not the fancy creations of inventive cranks, but cloud clippers which have actually made flights.

A series of competitions, specially interesting to those engaged in outdoor callings, will be provided by cycle campers. Camps are to be formed in the country outside London, and on the word of command the tents will be struck and packed, and the campers will ride to Olympia, where they will have to re-form their canvas dwellings, cook the evening meal, and make all snug for the night.

The Governments and Consuls of many countries are assisting, and sixteen cinematograph machines are to be constantly employed to reveal, free of charge, the wonders of other lands. Renowned travellers, such as Mr. Harry De Windt, will tell of their exploits in little-known corners of the world.

We hope that all readers of Tropical Life will make a point of visiting this exhibition. Some of our best friends will be exhibiting there. No side shows will have to be paid for. The shilling admission fee admits to everything in the exhibition. Further, there will be no cheap jewellery merchants to thrust their wares—often offensively in the case of many other exhibitions—upon visitors. It is worthy of note, as showing the immense amount of labour such an exhibition entails, that eighteen months have been spent in getting together from all parts of the world the collections which will be seen there.

The German Government Gazette, in reporting on the exhibition, points out: "The management thereof lies in the hands of the organizer of last year's International Rubber Exhibition, Mr. A. Staines Manders, a business-like organizer of exhibitions, known as thorough and trustworthy. There should be no misgivings in connection with Germans interested in the exhibition taking part in it, especially as, in view of the personality of the organizer, conscientious fulfilment of all obligations may be expected."

The cocoa sales on May 18th met with a slow demand, and out of 9,800 bags offered only 3,500 sold. Of these, 2,300 bags were Grenadas, which sold rather lower at first, but towards the end of the sales stiffened in values, finally realizing 56s. 6d. to 57s. for very fine lots; good to fine 53s. 6d. to 56s.; good to fine Jamaica, 54s. to 56s.; good Ceylons, 73s. to 79s.

Sugar.

MR. C. CZARNIKOW, writing on May 6th, stated that the absence of any reference to sugar in this year's Budget was probably a disappointment to various holders who had imported white sugars during March—April in excess of requirements, but a rise in sugar duties would probably have been worse for the market in the long run, as the duty-paid price of sugar leaving good profits would have become more depressed than when holders have to face a loss. With the reduction in the Porto Rico estimate from 250,000 to 215,000 tons, both crops combined show only a moderate change, whilst, on the other hand, meltings are going on at a large rate, 50,000 against 40,000 tons being the figure cabled this week, which completes a total of 228,000 against 200,000 tons during the last five weeks, and Willett puts April alone at 215,000 against 174,000 tons, being an excess of 60,000 tons in March—April. Evidently last year's figures were understated, and such rate cannot be kept up, but even with more sugar in Cuba it seems that a larger quantity of Javas than calculated would be required to provide fair stocks for the end of the year. It remains to be seen, however, whether New Orleans wants as much excess as expected. Consumption will be somewhat influenced by the fruit crop, which, owing to frost, is said not to start quite as well as in 1908.

In the United Kingdom, from all we can hear, with 220,000 against 100,000 tons imported in five weeks, the deliveries from Bond have been enormous, and we are likely to see startling figures, which may necessitate a valuation of stocks in order to arrive at fair comparisons with previous years. The German exports in April were 106,000 against 96,000 tons, in Austria alone 111,000 against 103,000 tons. Regarding Beet sowings nothing fresh can be said since last week. The weather was less seasonable, rather cool and tending to night frosts, which might have hurt the young plants.

The American market is easier in sympathy with Cuban news, and the quotation for 96 per cent. Centrifugals has receded to 3·86 cents = 10s. c.i.f. for non-preferential 96 per cent. = 9s. f.o.b. Hamburg for 88 per cent. net Beet. In the United Kingdom business in cane sugar has again been upon a limited scale; buyers are only willing to operate at a slight reduction in price, which sellers are disinclined to concede, except for sugars arrived or soon due. Grocery crystallized is only saleable in small quantities at previous rates.

From cane-growing countries there is little to report. In Cuba the weather generally seems favourable, though rain is likely to occur here and there, and in Louisiana conditions have improved. The last mail received from the West Indies confirms the serious shortage in the Barbados crop.

The total transactions of British West Indian for the week amounted to only about 2,000 bags, including Crystallized Demerara, middling yellow and palish 15s. duty paid, fine yellow, 16s. 9d. Trinidad Syrups, low heavy yellowish, 11s. Crystallized St. Lucia, middling yellow, 15s.

450 tons Brazil afloat, sold at 8s. 10½d. floating, landing, London, basis 82 and 83 per cent. polarization, and 200 tons May—June shipment at 8s. 9d. floating, landing, basis 82 per cent.

In Liverpool, 3,610 bags grainy Peruvian at 11s. 7½d. to 12s.; Syrups at 9s. 6¾d. to 10s. 6d.; 1,120 bags semi-grainy at 10s. 10½d. floating, landing, Clyde, basis 88 per cent. net analysis.

Tea.

By Messrs. WM. JAS. AND HY. THOMPSON.

THE Budget announcement, as advised in our last issue, has given general satisfaction to the various sections of the Trade, and notwithstanding the heavy duty paid stocks, we are able to report that there was still good general bidding and a fair business passing at the sales this week of both Indian and Ceylons, despite many prognostications to the contrary.

Last month's London figures cannot be of any use just now for comparative purposes owing to the very large clearances, but the fact remains that stocks in bond are at an abnormally low figure.

This week's (ending May 8th) sale of Indian tea has been the smallest of the season. The catalogues contained but a small selection from the various districts, Southern Indian teas being well represented, and these sold with a very firm tone, prices for good liquoring brokens frequently marking a slight advance. Among Assams, all standout teas were picked out and procured full rates. Tippy teas, both Orange Pekoes and brokens, in consequence of the very limited supply, being wanted at satisfactory values. Common and ordinary medium descriptions of black leaf and broken, though firm, cannot be quoted appreciably higher, while red and stalky teas as usual were difficult of sale, except where accompanied by exceptional liquor character. The quotation for clean sweet liquoring Pekoe Souchong remains at 6¼ per lb. The few suitable shipping teas in the sale were appreciated. Dusts and Fannings were in rather more enquiry, and prices made were fully firm.

Noteworthy averages were of necessity few, the best being: Assam—Sonajulie, 10d. Dooars and Terai—Gungaram, 9¾d.; Meenglas, 8½d. Travancore—Kolie Kanum, 8¼d.

For the whole sale 7½d. per lb. was realized, against 8⅛d. per lb. last year.

The following telegram from Calcutta relative to crop prospects has been received: "The out-turn last month was poor from all districts except Upper Assam, which was normal. In Lower Assam and Sylhet, where the rainfall has been deficient, immediate prospects are bad, but elsewhere the outlook is satisfactory. From Darjeeling, however, severe hailstorms are reported, and considerable damage has resulted to crops."

Considering the large quantity of Ceylon brought forward since the announcement of the Budget, the sale on Tuesday, comprising some 31,631 packages, passed off with a very firm tone, buyers bidding freely for all kinds. Occasionally some irregularity was noticeable for the better class brokens, which here and there sold slightly easier; but this was generally confined to where quality was inferior. A fair number of export orders helped the market for good useful Orange Pekoes and Pekoes, while the medium descriptions remain fully steady at late rates. For the low grades competition was keen, but no change in values can be recorded.

The best averages realized were from the following gardens: Caledonia, 11¼d.; Mount Vernon, Sutton and Udaradella, 10¾d.; Tillicoultry, 10½d. For the whole sale the result was 8¼d., compared with 8d. in 1908.

The China season being now considerably advanced, the amount of tea on offer is somewhat small.

A steady sale of Javas resulted for all grades, coloury brokens attracting attention at firm prices. The best averages made were: Goalpara, 9¾d.; Tanawattee, 9¼d.; Girilaja, 9d., with 7⅝d. per lb. realized for the whole sale, against 7¼d. per lb. last year.

The India-rubber Market.

By Messrs. S. FIGGIS AND CO.

THE end of April found the market for Pará firm, though there was not much business doing. Prices then ruled at 5s. 5d. spot for fine hard, and 5s. 4d. for fine soft; caucho ball, 3s. 6d.; slab caucho (Castilloa) was much wanted.

At the public sales on April 30th Malay sheet, fair to fine, sold at 5s. 4¾d. to 5s. 5½d.; mixed, part pressed, 5s. to 5s. 3¼d. Crêpe, very fine pale, 5s. 6d. to 5s. 6¾d.; good to fine pale, 5s. 4¼d. to 5s. 5¼d.; fair to good palish, 5s. 3d. to 5s. 3¾d.; light brown and grey, 5s. 1½d. to 5s. 3d.; clean and dark brown, 5s. 0¼d. to 5s. 1½d.; dark and specky, 4s. 10¼d. to 5s.; black softish, 4s. 5½d. to 4s. 6d. Scrap, fair to fine, 4s. 6½d. to 4s. 9¼d.; mixed, part inferior, 3s. 9d. to 4s. 0½d. Rambong, crêpe, good clean red, 4s. 10d. to 5s.; scrap, 4s. 2½d. to 4s. 6d.

Ceylon.—Sheet and biscuit, fair to good pale, 5s. 4¾d. to 5s. 5¾d.; scrap, good, 4s. 9¼d. to 4s. 9½d.

Central American and Columbian.—Fair brown scrap, 3s. 2¾d.; soft, 3s. 0¾d.

Mozambique and Zanzibar.—Common unripe, 1s. 8d.

On May 7th fine Bolivian was selling at 5s. 4d. and fine hard 5s. 4½d.; fine soft, 5s. 3½d.; caucho ball, 3s. 5¾d. to 3s. 6d. per lb.

There was little done during last week till the 14th, when some quantity was bought, mostly covering sales, at ½d. advance, and Plantation sold firmly at last auction values. At the auctions on May 13th there was eager competition at 1d. to 2d. advance, and prices included :—

Malay.—Sheet, fair to fine, 5s. 5¾d. to 5s. 6¼d. Crêpe, very fine pale, 5s. 6¾d. to 5s. 7d.; good to fine pale, 5s. 5½d. to 5s. 6½d.; fair to good palish, 5s. 4½d. to 5s. 5d.; light brown and grey, 5s. 3d. to 5s. 3¾d.; clean and dark brown, 5s. 0½d. to 5s. 2½d.; dark and specky, 4s. 10d. to 5s.; black softish, 4s. 6d. Scrap, fair to fine, 4s. 9d. to 4s. 11d.; mixed inferior, 2s. 10d. to 4s. 3d.

Ceylon.—Sheet and biscuit, fair to good pale, 5s. 5¾d. to 5s. 6d. (two lots superior pale, 5s. 7½d. to 5s. 8d.). Crêpe, fine pale, 5s. 6½d.; fair pale, 5s. 4¼d.; clean brown, 5s. 2½d. to 5s. 4d.; dark brown, 4s. 10d. to 5s. 1¾d.; black soft, 3s. 8d. to 4s. 7d. Scrap, fair to fine, 4s. 8½d. to 4s. 10d.

Orinoco.—Unsorted sold at 5s. 3½d.

Central American.—Common soft scrappy, brown and white, 2s. 11d. to 3s. 1¼d.

Uganda Plantation.—Sheet, clean hard pressed, 4s. 10¼d. to 4s. 11¾d.; fair pears, 3s. 8¼d.

Mozambique.—Lamu ball, 3s. 3¼d. to 3s. 5½d.

Abyssinian.—Fair sheet at 3s. 2¾d.

Assam.—Superior plantation clean, 4s. 8d.; brown and soft, 3s. 9d. to 3s. 10d.; fair red Assam, 4s.; pickings, very heated, 1s. 8d. to 1s. 10d.

Pará rubber statistics for the month of April (tons) :—

	Pará.	Caucho.	1909.		1908.	1907.	1906.
Receipts at Pará ..	2,360	1,400	= 3,760	agst	3,100	4,490	2,500
Shipments to Europe	1,480	860	= 2,340	,,	2,000	2,600	1,480
,, America	1,450	460	= 1,910	,,	1,050	2,000	900

Crop statistics, June 30th, 1908, to April 30th, 1909 :—

		Pará.	Caucho.	1908-09.	1907-08.	1906-07.	1905-06.
Pará Receipts	1908-09	27,430	6,750	34,180	31,780	33,880	30,520
	1907-08	25,910	5,870				
,, Shipts.,	Europe	12,260	4,440	16,700	19,110	16,360	17,635
,, ,,	America	14,790	2,180	16,970	11,610	16,710	12,735

The London Cocoa Market.

By THE EDITOR.

THINGS are quiet, more quiet than they have been since 1905, leaving out, of course, those weeks of famine when there was nothing to buy or sell. Those having cocoa ready would be well advised to hurry it forward, to be placed on the market as speedily as possible. London undoubtedly, with its international open competition, will be the best centre to ship to during the months to come. We have still room for more, whilst America has several months' supply to digest, and the Continent is not so steady as we have been since the collapse of the American demand. Imports since January into the undermentioned ports are of interest :—

January—April	1909.	1908.	1907.	
London and Liverpool ..	256,879	238,633	148,141	bags.
New York	307,027	149,684	215,165	,,
Hamburg	265,031	240,116	180,943	,,
Havre	142,143	156,485	90,062	,,

Against this let us compare the exports from those producing centres whose figures are available or worthy of notice :—

		1909	1908	1907	
Guayaquil ..	4½ months	307,800	251,500	172,000	bags.
Bahia	4 ,,	153,932	165,468	101,650	,,
San Thomé ..	4 ,,	160,263	147,719	123,732	,,
		1908-9	1907-8	1906-7	
Trinidad, Oct. 1—May 1		189,073	168,670	87,785	,,
Grenada ..		54,254	53,638	48,106	,,

With other centres, San Domingo to the end of February had not done so well as last year, her total exports being 2,846 tons (of 1,000 kilos), against 4,726 last year and 3,564 tons in January-February, 1907. Our own Gold Coast Colony, on the other hand shot far ahead in her January shipments, exporting 7,666,000 lb., against 5,250,000 lb. last year and 3,000,000 lb. in January, 1907. This colony, therefore, exported over 17,000,000 lb. of cocoa in the two months December-January. All, I suppose, "headed" down from the estates. What a freight for a light railway!

The Board of Trade returns for the United Kingdom show, I regret to see, a falling-off during April in our deliveries for home consumption (1,443 tons, against 1,988 tons last year and 2,350 tons during April, 1907). The same as the Continent, we evidently had to stand by whilst America during April imported all that she could buy in anticipation of a possible duty on raw cocoa, which, after all, seem unlikely to be imposed. It caused America, however, to gather in during last month 164,748 bags, against 34,861 bags in 1908; whilst Germany only received 30,189 bags, against 63,423 bags during April, 1909.

To make a long story short, the following are the latest figures regarding deliveries for consumption that I can secure :—

		1909	1908	1907	
Germany ..	3 months	11,625	8,341	10,190	Tons (Engl.)
France	3 ,,	5,690	4,894	5,726	,,
Holland	3 ,,	7,600	5,803	4,466	,,
Belgium	3 ,,	2,055	1,541	1,188	,,
Add :— Totals		26,970	20,579	21,570	,,
U.K. (raw only) ..	4 months	9,351	7,399	6,775	,,
U.S.A.	2 ,,	8,397	5,357	7,913	,,
Comparative Totals		44,718	33,335	36,258	,,

Were the United States figures to the end of April available the increase would be much more marked, as a

glance at the January-April "bag" deliveries show. A set-back must now be looked for, as the total imports for the whole of last year into New York were only 593,053 bags, so that America can be said to have imported over half a year's requirements in only four months. On the other hand, many consider that the States had so much leeway to make up that they can easily take in all they have done, and still only carry a normal invisible stock.

With nothing particularly attractive to offer, and no one anxious to buy, no public sales took place on May 11th. The market generally is very quiet, and though the home manufacturers bought freely, especially of Grenadas and "other West Indian," values dropped away after the export demand fell off, and planters must not be disappointed if they go lower, for they are sure to do so in face of the present state of supplies compared to the demand. The heavy receipts of Guayaquil naturally are having their effect on the quotations, and the price of fine summer Arriba at one time touched 58s. c.i.f. Climatic conditions in Trinidad are doing their best to curtail the June-July pickings, and, though the local demand is quiet, there is no pressure to sell, so prices remain fairly steady in comparison. In spite of the low price of Guayaquils sales seem very restricted, at any rate in London; but then the whole business for the last fortnight was under 5,000 bags, of which 3,000 were Grenadas. Prices on May 15th ran as follows:—

Trinidads.—Fine marks, 62s. to 63s.; good middling to fine good red, 59s. to 61s.

Grenadas.—Fine marks up to 56s.; ordinary unfermented to good fair fermented, 50s. to 53s.

Jamaicas.—Good to fine marks, 52s. to 56s.; fair reddish, 50s. to 51s.

St. Lucias.—Fine up to 57s.; good red, 54s. to 55s.; common to good fair fermented, 50s. to 53s.

Dominicas.—Are worth about 54s. to 55s., but none have been sold lately.

African.—San Thomé are nominally worth 55s., but no sales are reported; fair West Coast last sold at 47s. 6d. to 48s.

Bahia.—No sales. Superior should be worth 56s., and fair 52s. to 53s.

Costa Rica.—Good reddish, 55s. and 56s.; fair down to 51s. 6d.

Guayaquils.—Fine Arriba last sold at 70s.; good Machala at 63s.; fair Caraquez at 61s. to 61s. 6d. No large piles apparently could be placed at these rates, however, in the present mood of the market.

Ceylon.—Importers, unable to accept the trade's ideas of values, have sold no "estate" lately. Fair ordinary "native" realized 46s.; good to fine Ceylons, "estates," are nominally worth 70s. to 80s.

Stocks in London and at Havre on the undermentioned dates were:—

London, May 8th.	1909. Bags.	1908. Bags.
Trinidads ..	15,891	20,349
Grenadas ..	23,119	16,116
Other W.I. ..	4,961	4,022
Ceylons & Javas	20,866	13,980
Guayaquils ..	13,252	7,684
Brazils & Bahias	1,750	1,499
Africans ..	26,459	10,887
Other foreign ..	8,104	8,200
Total ..	114,402	82,737

Havre, April 30th.	1909. Bags.	1908. Bags.
Para	8,086	3,366
Bahia	19,947	18,123
Venezuela ..	28,712	30,595
Trinidad ..	30,468	34,731
Other W.I. ..	8,799	10,613
San Thomé ..	7,922	1,635
San Domingo ..	18,203	3,873
Haiti	11,140	12,228
Accra	16,136	12,262
Guayaquil ..	26,307	18,280
Total ..	175,720	145,706

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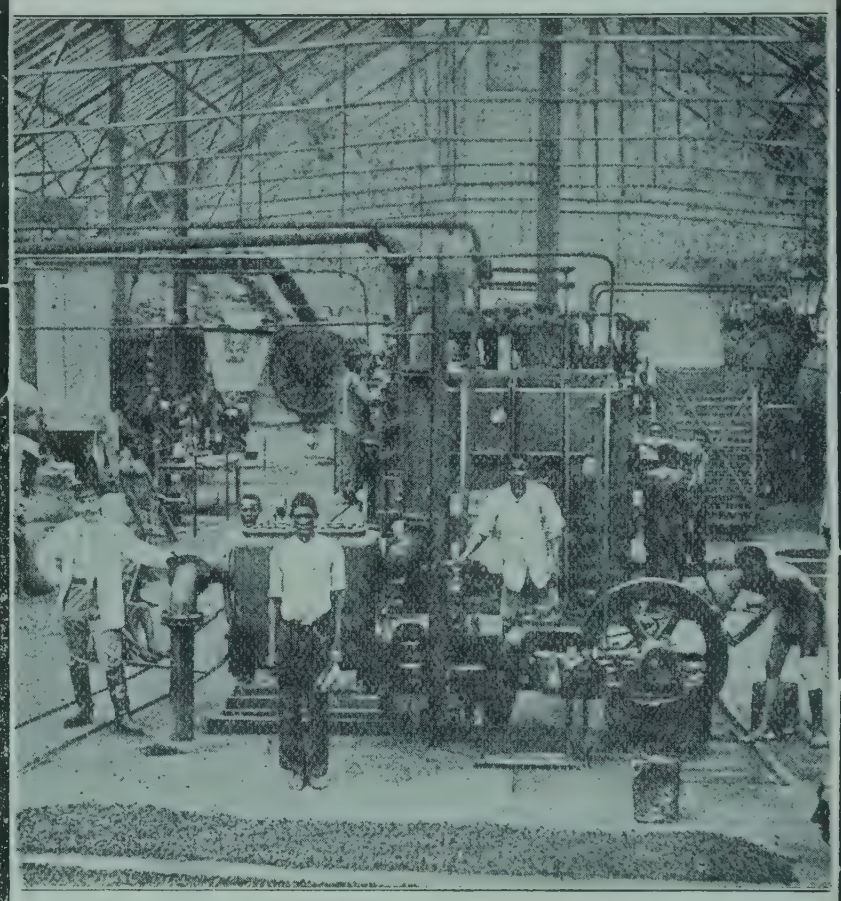

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A Monthly Journal devoted to the Interests of those living, trading, holding property, or otherwise interested in Tropical and Sub-Tropical Countries.

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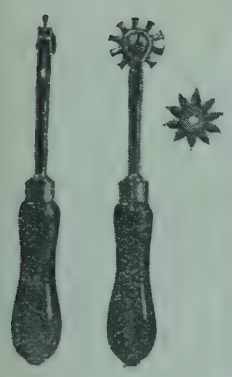

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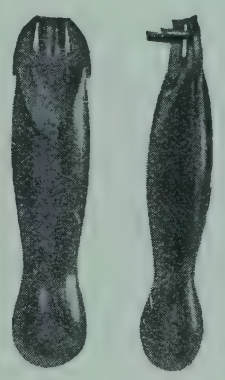

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"Tropical Life" Prize Fund for the best Essay on The Fermentation of Cacao.

The Earl of Crewe (Secretary of State for the Colonies) expresses his interest in the raising of the Fund.

WE shall be glad to receive your £5, if not already sent.

The following firms have shown their interest in this matter by subscribing £5 to the Fund :—

Messrs. Cadbury Bros., Ltd., Bourneville.
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Kakao-Einkaufs-Gesellschaft, Hamburg.
The Editor of TROPICAL LIFE, London.

We recently wrote calling the attention of the Secretary of State for the Colonies to the scheme for encouraging further research work in this matter, and expressed the hope that the tropical experts at home and in the Colonies would take a prominent and successful part in the competition, and received the following reply: "I am directed by the Earl of Crewe to acknowledge the receipt of your letter of the 17th instant, calling attention to a fund for awarding a prize to the best treatise on the causes of the changes which take place in cacao beans during the process of fermentation. . . . I am to inform you that Lord Crewe sympathizes with every movement to improve the technical process connected with tropical agriculture, and is interested to learn that this fund is being raised.

"I am, Sir,
"Downing Street, "Your obedient servant,
"*May* 21*st*, 1909." "R. L. ANTROBUS.

We submitted to Mr. William Fawcett, ex-Director of Agriculture at Jamaica, a rough draft of the various points that we wish to be included in the essay to be sent in, and he has very kindly sent us the following, which we feel cannot be improved upon. Intending competitors can therefore take it as a basis on which to work, for, as Messrs. Rowntree and Co. said in their letter, "any candidate who really understands the matter will, of course, strike out a line of his own, and will not follow too closely any suggestion that you may offer."

We therefore offer, with much pleasure, a prize of £50 for the best essay on :—

The Fermentation and Drying of the Cacao or Cocoa Bean (*Theobroma cacao*).

The essay should record precisely and in full detail the changes resulting from the processes of fermentation

and drying that take place in the bean from maturity in the pod to the time of putting the cured beans into bags for market. Biological as well as chemical changes should be noted. The action of maximum, minimum and optimum temperatures, and of checks producing differences of times in the fermentation and drying processes should be noted for every stage. The differences due to such variations on the resultant cured bean should be clearly traced. The possibility should be discussed of producing at will by such variations, and independently of the natural character of the bean, varieties of taste and of colour, both internal and external, so as to simulate the different kinds of cocoa known on the market. Alterations that might be made in ordinary methods so as to improve the quality of the cocoa should be explained. Waste products should be considered, and their potential value indicated.

The experiments on which results are based should deal with the beans in marketable quantities, and samples should be submitted in illustration of statements made.

"TROPICAL LIFE" PRIZE FOR THE BEST ESSAY ON THE FERMENTATION AND DRYING OF COCOA.

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I hereby agree to be bound in all respects by the decision of the Editor of TROPICAL LIFE and the conditions printed above. In case of dispute the Editor's decision to be final and binding.

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The Publishers reserve to themselves the sole right to publish any or all of the essays submitted.

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(4) An English translation must accompany all essays not written in that language so that the onus and risk as to correct translation will rest with the competitor.

(5) Essays must be written on one side of the paper only; when possible the essay should be typewritten. In any case the writing must be clear and distinct. Corrections causing doubt or difficulty to decipher must be avoided.

(6) All essays must be sent to the Editor of TROPICAL LIFE, at his City Office, 112, Fenchurch Street, London, E.C., to reach him on or before January 31st, 1911. No essay arriving after that date will be eligible for competition. Every essay will be acknowledged on receipt.

(7) Every essay sent in must have attached to the head of the first page the competitor's full name and postal address. In submitting the essays to the Judges, the name however will not be made known until after the prize is awarded.

(8) After the prize has been awarded any balance left over will be devoted to publishing those essays which, in the opinion of the publishers, are considered of sufficient merit.

(9) Competitors must fill in and attach the above coupon to their essay.

Owing to pressure on our space, Part VI. of the Castilloa article, and an account of the Cotton and Fibre Exhibition to be held in London in 1912 have had to be withheld.

The Economic Value of a School of Tropical Medicine.

This is the second of what we hope will be a long series of articles on the excellent work that the London School of Tropical Medicine is carrying on in the Tropics, in order to make life possible where it was impossible before, and to make it more certain where hitherto it has not been safe for Europeans to remain. No one can deny that such work is of the utmost importance if valuable colonial centres are to be developed, and useful lives saved. The trade of this country needs extending; we are told that we are already the heaviest taxed nation on earth, whilst it seems doubtful if we are the wealthiest.[1] *We hear a great deal about the necessity of "broadening the basis of taxation," but far too little about broadening the basis for earning the money out of which the taxation is to be obtained. This, however, is what* TROPICAL LIFE *and the London School of Tropical Medicine mean to do. "Lest we forget," therefore, who it is that is working so strenuously, so pluckily, but also so unobtrusively to enable the enterprising trader to fill his pockets, and the Government their coffers, this notice will appear so long as the articles are published.*

"Subscriptions are badly needed to enable those connected with the London School of Tropical Medicine to push on with their work. Every resident and visitor in the tropical zone benefits through this most necessary iustitution, we therefore hope that every reader of TROPICAL LIFE *will send a subscription or donation to enable the work to be further extended. Cheques or money orders can be sent to P. Michelli, Esq., C.M.G., Secretary, London School of Tropical Medicine, 'Dreadnought' Hospital, Greenwich, London, S.E., or, if preferred, to the Editor of* TROPICAL LIFE. *Acknowledgment will be made in this column for all amounts sent, no matter how small, if the sender will mention the name of this paper in his letter covering the remittance."*

IN our last number we were considering the general outline of the manner in which malaria is carried from man to man by mosquitoes of certain species. This theory was proved by tracing the development of the parasites of malaria in man, allowing these mosquitoes to feed on the man, and then tracing the further development of the parasites of malaria in the mosquitoes; but the theory, when applied practically, has been fully confirmed.

Some additional proof of demonstration was necessary to ensure conviction. Advantage was taken of the fact that in England malaria is now extinct, and that therefore, under ordinary circumstances, people brought up and living in England cannot be infected. Mosquitoes of a species that had been shown to be capable of carrying malaria were allowed to feed on a person in Italy who

[1] According to Mr. Barker, in the *Fortnightly Review*, Great Britain is taxed Mks. 95·80 per head, France, 82·70, United States of America 80·80, and Germany (if correct) only Mks. 47·17. On the other hand, we are told that, there are only £210,000,000 in the United Kingdom Savings Banks, against, £800,000,000 in the German Savings Banks, and the same in the American.

was suffering from tertian malaria, and these mosquitoes were sent to England to the London School of Tropical Medicine and allowed to bite two men who volunteered for the purpose. Both of these developed tertian malaria, and no other people in England did so in that year. Their infection must have been due to these mosquitoes.

It was often urged that whilst it might be admitted that mosquitoes were one of the ways in which malaria could be conveyed, yet that it was only one, and perhaps an unimportant one. The London School of Tropical Medicine therefore undertook another experiment. They built a small mosquito-proof house in a part of the Roman Campagna—notoriously malarial, so much so that it was considered that to spend a single night there was certain to be followed by an attack of malaria. The mosquitoes known to carry malaria were numerous.

Two men, both free from malaria, occupied this hut for three months during the most unhealthy time of the year. They were out in the daytime when that species of mosquito did not bite, but shut themselves up in the mosquito-proof house from an hour before sunset onward. The night air was freely admitted, but not the mosquito. Though the whole population was suffering from malaria, these two escaped; the only difference was that they were not bitten by the dangerous mosquitoes, indicating that the mosquitoes were not only *a* cause of the spread of malaria, but *the important*, if not the only, cause.

The mass of medical men and some others were convinced by such experiments, and measures for the prevention and diminution of malaria have been undertaken in many places. In some, destruction of the dangerous mosquitoes by destroying their larvæ has been practicable, and the results have been successful in proportion to the thoroughness with which the destruction of mosquitoes or their larvæ has been effected. To destroy them completely in most tropical countries will be impossible, but to deal with limited areas is practicable and—where many men are gathered together, as in the quarters and coolie lines on plantations—economical.

As an instance of the success which can be attained even when there are still a small number of the dangerous mosquitoes left, Klang and Port Swettenham may be taken. Drs. Watson and Travers, past students of the London School, supervised the operations. In these two places the amount of malaria was so great that not only were the Europeans constantly ill, and some of them either died or had their health permanently impaired, but the sickness and mortality amongst the coolies and other natives was so great that without double wages they would not work.

In 1901 the population was some 4,000, and 334 cases of malaria were reported at hospital in the year. Only the more severe cases could be admitted. Superficial drainage on a large scale was carried out during 1902, and in 1903 and 1904 the average number of cases of malaria was only twenty-nine, less than one-tenth of the number in 1901, although the population had increased.

As an instance of the pecuniary loss, 176 minor Government officials had amongst them one thousand and twenty-six days' sick leave in 1901, whilst in 1904 there were 284 minor officials, but they only required a total of seventy-one days' sick leave.

In 1906 there was a sudden increase in the amount of malaria, and it was found that in the course of some engineering works one of the main drains that had been made in 1902 had been blocked. The obstruction was removed and the amount of malaria promptly diminished. In the surrounding districts during the period 1902 onwards there has been a steady increase in the amount of malaria, showing that the decrease in Klang is not due to climatic or meteorological changes. Many other instances can be given where operations on a large scale have been carried out, resulting in a very great diminution in the amount of malaria.

The question is now one of economics. The drainage that is sufficient for sugar cane or rubber is sufficient to destroy most of the breeding places of some species of anophelines, as long as the drains are kept clear; but in other places the species of anophelines present are less readily destroyed. Too often in a well-drained plantation the coolie lines are at the edge of the plantation close to insufficiently drained land; under such circumstances they are bound to be unhealthy, whilst if in the centre of the cultivated area they would be quite healthy.

It is necessary in considering the question on any estate that the species of mosquitoes which carry malaria should be determined, and the breeding places of these mosquitoes sought out. An important part of the education given to medical men at the London School of Tropical Medicine is to enable them to make these observations, and with that in view a highly skilled entomologist is one of the teachers. Unless this point is determined much money may be spent in destroying mosquitoes that do not and cannot carry malaria, without improving the health of the place.

When the Medical Officer has determined these points, it is then a question for the planter whether it will pay to destroy such places and reduce the sickness from malaria by some 90 per cent., or, if too expensive, whether other less complete measures, such as the daily administration of quinine, would be more remunerative.

Modern medical training aims at reducing the amount of diseases by attacking the carriers of the diseases. Extirpation of all or even of most mosquitoes is a good thing for comfort, but the extirpation of the mosquitoes which carry malaria will be cheaper and effective, and in any case should be done first. The training required for a man practising in the Tropics requires, in addition to a knowledge of medicine, a sound and sufficient knowledge of entomology and medical zoology, as without this much waste of money will take place and result in ineffective measures. The dangerous mosquitoes must be known and their habits studied. In some places and with some forms of cultivation it will be useless to attempt to grow certain crops, such as rice, because the dangerous mosquitoes will breed in the Padi fields; in other places there is no such danger, as the species of anophelines which are present will not breed in such places.

For the detailed knowledge required special training is necessary. Such training is provided by the Schools of Tropical Medicine, but is necessarily expensive, more so than the students at such schools are able to pay, and an endowment is therefore necessary. The laboratories at the London School require to be enlarged; space for exhibition of the mosquitoes and other disease-carrying insects is urgently required. An expenditure of a few hundred pounds would place the School in such a position that even a newly qualified medical man would be able in any part of the world to advise as to the most successful and economical measures for dealing with these dangerous pests, and repay over and over again to the planting community the expenses incurred.

Planting Experiments at the Agricultural Experimental Station, Zimbiti (Mozambique).

By W. H. JOHNSON, F.L.S. &c.,[1]

Director of Agriculture to the Companhia de Moçambique.

THE Zimbiti Station is the first of the three Agricultural Experimental Stations which the Companhia de Moçambique has decided to establish for the purpose of testing the agricultural possibilities of the three different zones in its territory. It is situated in the Low Country, 35 kilometres distant from Beira, and is adjacent to the Beira and Mashonaland Railway. The soil in this neighbourhood varies from a light, sandy alluvial to a rich, heavy clay. A stream flows through the centre of the site selected for the station, and the land in the vicinity of this was thickly covered with large timber trees.

SUPERINTENDENT'S HOUSE,
Agricultural Experimental Station, Zimbiti, August, 1908.

The station is named after a timber tree which is very common in the neighbourhood and known to the natives as Zimbiti. Botanical specimens of this tree were forwarded for identification to the Royal Botanic Gardens, Kew, which resulted in eliciting the fact that it is new to science, and it has been distinguished by the Kew authorities as *Androstachys Johnsonii*, Prain.

It was intended to clear about 20 hectares for preliminary experiments, but as the commencement of this work was delayed until November 18th, 1907, by which time the rainy season was well advanced, it was only found possible to prepare about half this area for the first season's cultivation. The remainder was, however, cleared and prepared for planting before the end of the year (November, 1907, to November, 1908), the period covered by this report.

DEMARCATION OF LAND.

The selected area was divided up into twenty square blocks, each measuring 1 hectare, and each of these was subdivided into square plots containing $\frac{1}{16}$ of a hectare.

The hectare blocks were numbered consecutively from 1 to 20, and the small plots were given a letter of the alphabet from A to P, as shown in the plan sent in with the report.

This system of demarcation considerably facilitates reference to any particular area, and will enable a correct record to be kept of the crops grown in successive years on every portion of the station. Such a record is of considerable importance in estimating the effect of various crop rotations.

STAFF AND LABOUR FORCE.

The European staff consisted of the Superintendent and his assistant, and fifty native labourers were constantly employed.

CROPS.

The principal annual crops grown were cotton, maize, and tobacco. Owing to the delay which occurred in commencing the clearing and ploughing operations, all of these were sown from six weeks to two months too late in the season. The yields obtained cannot, therefore, be accepted as a fair criterion of the probable yields from

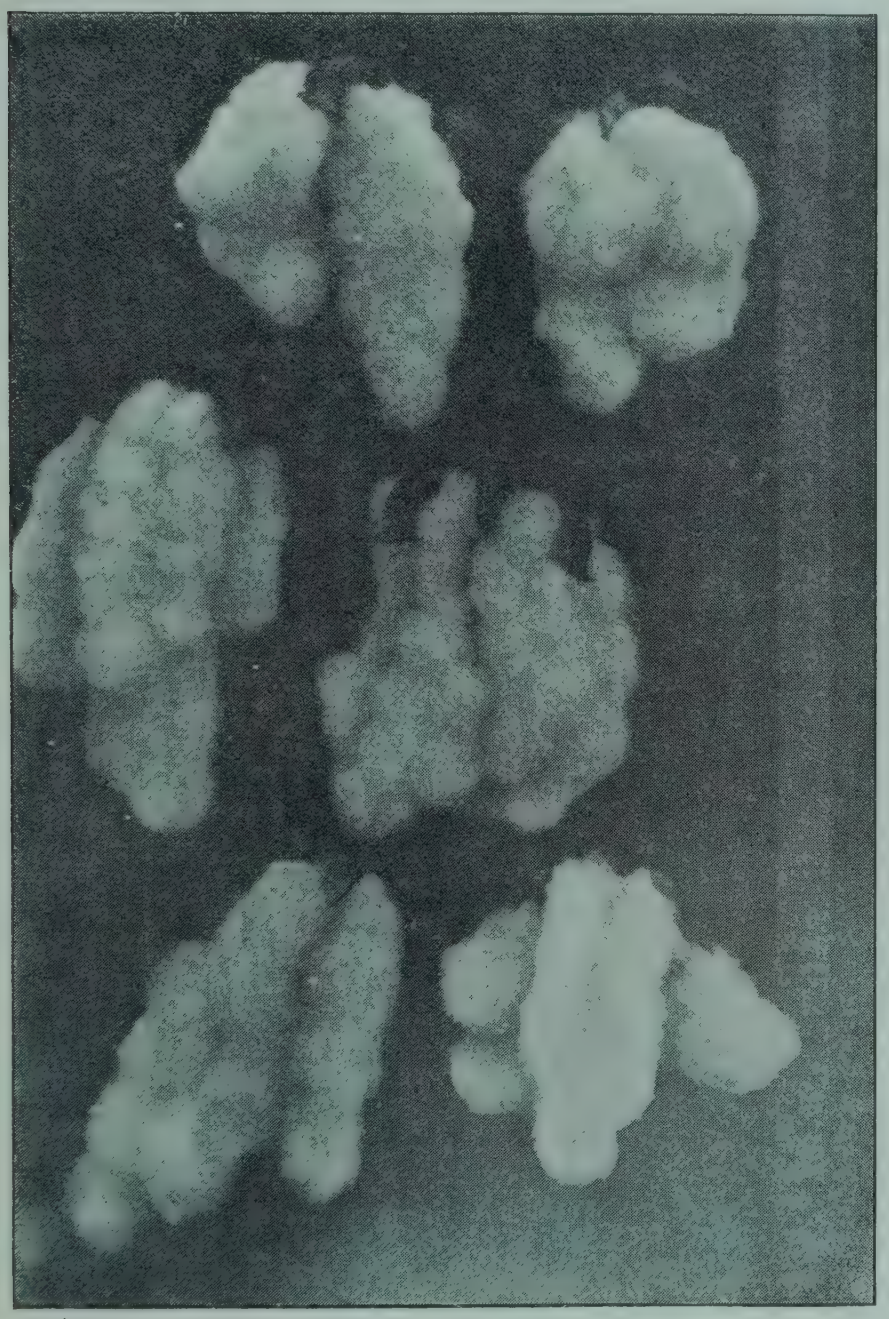
[1] TROPICAL LIFE "Friend" in issue of June, 1908.

these crops when grown under more favourable conditions. Previous to planting, the land for each crop was thoroughly cleared of all roots and tree stumps, then hoe-ploughed and levelled.

The Superintendent's records and field notes in regard to each crop were given in schedule form in the appendix to this report when sent in.

Cotton.—Twenty different varieties of cotton were tested, and the following tables furnish details in regard to the results obtained from each.

The Sea Island (Cherinda) plot measured $\frac{1}{25}$ hectare, the area of all others being $\frac{1}{8}$ hectare. All the plots were similarly treated in regard to weeding and harrowing.



SIX WELL-EXPANDED BOLLS OF LONG STAPLE UPLAND COTTON, VARIETY "COOK."

Agricultural Experimental Station, Zimbiti, August, 1908.

All the plots were attacked by caterpillars and aphis, but these were promptly exterminated by sprayings of Paris green and kerosine emulsion respectively. Grasshoppers were troublesome to young plants, and stainers appeared in each plot as soon as the bolls matured. Vacancies were resown in each plot until a regular stand of plants was obtained.

The yields given in the following schedule still further corroborate the opinion expressed by the writer in previous reports in regard to the advisability of substituting upland varieties of cotton, and preferably the long staple types, for the Egyptian and Sea Island varieties formerly grown in this territory.

Description of variety	Yield of seed-cotton per hectare	Yield of lint per hectare	Percentage of lint to seed-cotton
Long Staple Upland	kilos	kilos	
Allen's Long Staple	261·04	84·00	32·18
Allen's Hybrid	118·40	36·00	30·40
Allen (Cherinda)	472·80	152·80	32·32
Griffin U.S.A.	417·60	137·60	32·95
Griffin (Cherinda) ..	406·00	106·00	26·1
Cook	284·80	88·40	31·03
Commander	463·20	123·20	30·55
Southern Hope	309·36	100·8	32·58
Peeler	724·80	246·4	33·99
Bailey	725·60	240·00	33·07
Moon	483·20	160·00	33·11
Mitafiffi Egyptian ..	131·20	41·20	31·40
Jannovitch Egyptian ..	40·64	9·60	23·62
Abassi Egyptian	97·92	29·60	30·22
Sea Island (St. Kitts) ..	*Nil*		
Sea Island (Cherinda) ..	*Nil*		
Short Staple Upland			
Bates' Big Boll	250·72	86·40	34·46
Bates' Favourite	244·80	80·00	32·67
Champion Cluster ..	532·40	168·00	31·55
King	635·20	224·00	35·26

As it is considered that a yield of 200 kilos and 170 kilos of lint per hectare of short staple and long staple upland cotton respectively is required to ensure a profit in this territory, it will be observed that, notwithstanding the disadvantages under which this cotton was grown, these yields were exceeded in three different instances. The comparatively high percentage of lint to seed-cotton obtained from the long staple upland varieties is specially noteworthy. These varieties rarely yield more than 30 per cent. of lint to seed-cotton, yet this percentage was exceeded in every case, with one exception only. The length, strength, and colour of the lint of the various upland varieties compared very favourably with these characteristics of the lint produced by similar varieties in the Southern States of America. The lint of the Egyptian varieties was, however, decidedly inferior in each instance.

Maize.—Eleven different varieties of this crop were experimented with. Caterpillars and grasshoppers did a good deal of damage. The former were eventually checked by spraying with Paris green, but this remedy was not so effective with the grasshoppers. A stem-borer was exceedingly troublesome. As its attacks are principally confined to the interior tissues of the stem, applications of insecticides had little effect in checking its depredations.

The plots for this crop were prepared in a similar manner to those for cotton. The land in each plot was kept free of weeds and harrowed when necessary. Vacancies in each plot were re-sown.

The subjoined schedule shows the yield of dry grain per hectare of each variety; $\frac{1}{33}$ hectare was sown with the Hickory King variety, and $\frac{1}{16}$ hectare with each of the others.

	Yield of grain per hectare
White Bango	1,968 kilos
Chester County Mammoth	1,424 ,,
Golden King	1,376 ,,
Iowa Silver Mine	1,040 ,,
Hickory King	990 ,,
Early Star Leaming	656 ,,
Wisconsin White Dent	576 ,,
Champion White Pearl	496 ,,
Thorobred White Flint	241 ,,
Improved Early Horse-tooth	128 ,,
Extra Early Horse-tooth	112 ,,

(*To be continued.*)

Manilla Hemp.

FIBRE PRODUCTION AS SEEN IN DAVAO, PHILIPPINE ISLANDS.

By MAX L. MCCOLLOUGH,

Secretary Davao Planters' Association.

MANILLA hemp is known around the world. Wherever shipping goes rope and hawsers large and small made from this fibre are to be found. The production of this "manilla" fibre, however, is to be found nowhere except in the Philippine Islands, and there only in that part of the archipelago lying south of the city of Manilla, south of the fourteenth parallel of latitude. Attempts to break the natural monopoly in the production of this fibre held by the Philippines have without exception been failures. For some unexplained reason this hemp cannot be grown outside this archipelago. Plantings from Philippine seed in the near-by island of Borneo proved, that although the plant grew vigorously, it was lacking in the very quality which gave it value, viz., the strength of its fibre.

During the long period of Spanish rule in the Philippines, and even up to the present time, the methods used in the production of "manilla" fibre have been exceedingly crude. Only recently has a scientific study of the plant itself, combined with the application of modern inventive genius to the problems of the harvest, brought forth results which point to the dawn of a new era in "manilla" fibre production. This era will be characterized by the substitution of machinery for the laborious processes of hand labour. Whether the production of this fibre will be revolutionized as much by these changed conditions as has, for example, the production of wheat is a question which can be answered only by the future. Certain it is, however, that to some considerable extent the production of hemp in the Philippines will be modified by the introduction of machinery. Where the supply of labour is limited as it is in these islands, and where one man can by his own efforts clean only 15 to 20 lb. of fibre per day, the scale on which individual hemp plantations can be maintained is, perforce, limited. For this reason, perhaps, no large hemp plantations are to be found in the Philippines. Foreign capital has not been able to enter this field of production and by expert management to compete with the native peasant proprietor. Some attempts have been made to lessen the cost of production of fibre by larger plantings and an increased output, but in most cases the difficulty of procuring and retaining a sufficient supply of labour has made such attempts alike troublesome and unprofitable. With the possibility of using modern farm machinery in the planting and care of the young plants and a machine in the harvesting of the fibre, which with three men to operate it is said to turn out from 800 to 1,000 lb. of fibre per day (and such

MAYON VOLCANO, SOUTHERN LUZON.
(In heart of Manilla hemp district.)
Hemp is planted by natives two-thirds of the way to the summit.

machines are so advertised and are now on the market), the future of "manilla" hemp raising presents new and more promising prospects.

In the Davao district—a part of the Moro province—some plantations have been laid out along these modern lines. Here one can see the soil turned with breaking ploughs and the young crop tended with the most improved farm machinery, and with the minimum of hand labour and expense. Fibre-cleaning machines have also been installed, and give every promise of successful operation. Hemp planters generally throughout the Islands are looking to-day to the colony of white men in this district in the south for the solution of many of the problems which confront them in their attempts to satisfactorily supply modern markets with fibre produced in the crude and antiquated ways of a century ago.

ABACÁ OR MANILLA HEMP (*Musa texilis*) PLANTATION AT SAN RAMON, MINDANAO.

Abacá in Mindanao is generally planted on level or slightly rolling ground.

PRODUCTION OF "MANILLA" FIBRE.

The Plant.—The plant which produces the "manilla" fibre of commerce is as different from that which produces the so-called "hemp" of the Southern United States as a banana palm is different from a stalk of broom corn. *Musa textilis* (or, as it is known in the popular language of the Philippines "abacá") is a member of the plantain family. It is found growing wild among the small forests covering the hills and mountains of the moist islands of the Southern Philippines. It grows to a height of from 20 to 30 ft., and attains a diameter at the base of the stalk of from 10 to 14 in. The leaves of the plant, from the gracefully spreading crown, unite and continue down to the root in leaf-sheaths or "petioles." These more or less concentric petioles taken together form the stalk or trunk of the plant. In the centre of this stalk is found a non-fibrous core which serves as a sort of cambium layer, from which in the growing plant new petioles and leaves are produced. The leaves proper of the abacá plant are worthless as fibre-producers, and are lopped off and discarded when the plant is to be harvested or "stripped." The plant at maturity, cut down just above the roots and divested of its crown, is ready to be worked up into fibre, which is to be found running longitudinally embedded in the more fleshy material of the petioles. These leaf-sheaths or petioles, as has been said, are formed around the central core of the plant something like the layers of a very much elongated onion. Abacá is propagated from seeds or suckers, or by the planting of the root-bulbs of the plants themselves. It reaches maturity in from two to three years from planting, and propagates itself naturally by sending out sprouts or suckers from the roots of the parent stalk. Thus each "seed" produces not only one stalk, which can be cut down and harvested in about two years, but also by sprouting forms a colony of smaller stalks of varying size, which as they mature can be cut and stripped as well. These colonies of individual hemp stalks, grown from a single "seed" or root-bulb, are known in the country of Davao as "hills." A hemp "hill" frequently contains as many as twenty, thirty, or even forty stalks, varying in size from the mature stalk ready to be cut down and worked up into fibre to young sprouts just coming through the ground.

(*To be continued.*)

Rubber and the Navy.

MR. ARTHUR W. STEDMAN, as President of the New England Rubber Club (says the *India Rubber World* for April), made the following remarks about the business interest that the rubber trade has in naval shipbuilding. "In 1844," he told the guests at the Club's Annual Dinner, when proposing the health of President Taft, as Commander-in-Chief of the American Navy, "rubber was first introduced to the navy. To-day, a modern battleship is quite dependent upon rubber; the pulsing of the great engines is controlled by rubber valves and rubber packing. Without its electrical equipment insulated with rubber, the fighting and operating efficiency of a battleship would be reduced to such an extent that it would be practically hopeless. This item alone, I am told, represents a cost in the recent type of battleship, of nearly, if not quite, a quarter of a million dollars." The building of "Dreadnoughts" in Europe and America therefore, at the present rate of progress, promises to make important demands upon the rubber producing world. Military motors, airships and warships, are all large consumers, and the tendency will be to increase the quantity of rubber that they use. Turbines and heavy machinery have also of late been set upon rubber stools, which are introduced between the machines and the concrete base; the whole being bolted together.

"Tropical Life" Friend.—No. 48.

Dr. JULIUS LEWKOWITSCH, M.A., Ph.D., &c.,

Chairman of the London Section of the Society of Chemical Industry, and Member of the Executive Committee of the International Congress of Applied Chemistry, recently held in London.

"OUR FRIEND" this month is a great linguist. Meeting him at the Rubber Exhibition last year, we introduced him to Dr. Soskin, of Berlin (who at one time was Editor to the *Tropenpflanzer*, and is now planting consultant to the Kolonial-Wirtschaftlichen Komitee at Berlin on their African and other planting enterprises) and the two conversed in many tongues—Russian, German, French, as well as English. At the International Congress of Applied Chemistry, held this year in London, and which came to an end on June 2nd, Dr. Lewkowitsch, as Chairman of the London Section of the Society of Chemical Industry, received the delegates, and, as the Press in commenting on the proceedings reported, their host addressed the delegates from the various countries—French, German, Italian, &c.—each in his own tongue, with the same facility with which he spoke English.

"Our Friend," as a matter of fact, first saw the light of day in the kingdom of Prussia just over fifty years ago. After the usual thorough technical and general education that every German receives, "Our Friend" entered the University of Breslau, where he took his Ph.D. in 1879, then proceeded to Strasburg, and completed his studies in botany, zoology, and mathematics. After that he took up research work on the resolution of various acids—mandelic, lactic and glycéric—into optically active isomerides. After being connected with various petroleum, tar, and other works near Berlin, Dresden, &c., Dr. Lewkowitsch became technical manager to Messrs. Watsons, the well-known soap manufacturers at Leeds, where he became a naturalized British subject in 1889. In 1895 Dr. Lewkowitsch commenced practice as a consulting chemist in Manchester and London, finally making London his headquarters, his City address, 35, Queen Victoria Street, E.C., being the same as that of Mr. Leslie Radclyffe, the well-known rubber machinery expert, who figured as "Our Friend" in the August, 1908, issue.

Dr. Lewkowitsch, we are glad to say, agrees with us that the cultivation of the coco-nut palm throughout the Tropics, in those centres, of course, where it can be cultivated to advantage, is capable of great extension, and would well repay private enterprise to take it up. This would especially be the case when the planter, so as not to put all his eggs into one basket, also cultivates cacao, and rubber when possible, so that he can ship several economic products, the demand for which tends to increase year by year. For this reason "Our Friend" has expressed his pleasure at our endeavours to stimulate more interest in the cultivation and exploitation of oil-producing trees, as the market for their produce is open to further development. He is also much interested in our endeavour to encourage further research work into the changes resulting from the processes of fermenting and drying the cacao beans, as cacao butter, like all other oils and fats, commands his close attention.

We knew "Our Friend" first as the author of "Chemical Technology and Analysis of Oils, Fats and Waxes," which now, in its fourth edition, has been further increased to three volumes, and as the author of the "Laboratory Companion to the Fats and Oils Industries." These books have also appeared in the French and German languages.

In 1904 Dr. Lewkowitsch delivered the Cantor Lectures on "Oils and Fats, their Uses and Applications," before the Society of Arts. He has contributed some 120 papers to technical societies, not only on his beloved "Oils and Fats," but also on "Chemical Engineering." In April, 1909, he was the "Conférencier" of the Société Chimique de France, and read in Paris before the members a comprehensive address on "Les Corps Gras (Industrie et Analyse)."

SIR Charles S. Bayley, K.C.S.I., resident at Hyderabad, and late acting Lieutenant Governor of Eastern Bengal, speaking as Chairman at the Assam Annual Dinner in London said: "I HAVE frequently seen in the newspapers, letters from the Anti-Tea Duty League, calling attention to the hardships of the tax, and I am sure that you will agree that we—producers and consumers alike—owe a deep debt of gratitude to the League, to its Chairman, Mr. Roberts, and to its Secretary, Mr. Cope, but for whose exertions we might still be paying a crushing duty of 8d. per lb." As pointed out in TROPICAL LIFE for May, it was Mr. Cope who wrote the articles of which Sir Charles S. Bayley expressed so high an opinion to those present, forming the largest gathering of Assam tea planters, &c., that have come together for years.

A JAMAICA Engineer writes:—"I take TROPICAL LIFE regularly and find it very useful."

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Tropical Life.

JUNE, 1909.

The East Indian Coolie in our Crown Colonies.

AT one time we were opposed, on principle, to importing East Indian coolies into the West Indies, and elsewhere, as the introduction of this low-class alien labour competes against the local supply and lowers the scale of wages. In the West Indies the creole labour supply is composed of the negro or mixed negro element. There is no denying that, at times, this class of labour is uncertain, both as regards its quality and quantity. But, then, is the labour market at home always perfectly satisfactory, not only from an employer's point of view, but from that of the general good of the country at large? It is a marvel to us how some apparently well-to-do British workmen and small master-men ever succeed in inducing anyone to employ them, for their boorish and self-assertive manners are, to our mind, more objectionable and difficult to put up with than any "sauciness" on the part of the West Indian negro, who (if not called "nigger" to his face and treated as snobbish or uneducated whites seem to think is the correct way to handle them) are not, on the whole, half bad fellows.

To-day, however, our views on the question of coolie immigration resolve themselves into this: If the East Indians have a real friend and sympathizer in their Protector of Immigrants, but at the same time one who can be firm and strict when occasion and duty demands it, then, from all we can see and hear, the system, on the whole, undoubtedly works for the good of both employer and employed, as well as of the Colony at large. We believe that opponents to the system are influenced to a considerable degree, as we were, by causes that should not exist, such as an unsatisfactory Protector, or the way "coolie riots" (generally caused, in the first place, by the coolies protesting too vigorously against unjust or unpopular demands) are put down and the coolies alone made to suffer by the police-court prosecutions, Government reports, &c., showing a tendency, as *Truth* once put it, of the planters rather than the coolies being the "protected ones."

If we remember rightly, when our Editor was last in Trinidad (W.I.), Mr. Mitchell, then Protector of Immigrants—and a better one, from the coolies' point of view, has never been appointed—showed that, whilst the coolies were guaranteed 1s. a day for their pay, owing to the heavy tasks allotted to them as "a fair day's work," the actual average payment barely reached 6d. per day per adult man. This undoubtedly prejudiced many against the system, as it savoured of the British Government breaking faith with the poorest of our Indian subjects. To increase the dissatisfaction, it was noted that soon after Mr. Mitchell's report appeared he resigned his post; and whether he was promoted or "shelved" did not alter the fact that he was not the Protector for long after the appearance of the report that went so much against the planters.

As is far too often the case in matters of public importance, very few of the public except those who employ the coolies take any real interest in the question. We believe that the Departmental Committee now sitting to enquire into the question of coolie immigration is experiencing considerable difficulty in obtaining evidence against the introduction of outside labour into our Colonies, owing to the indifference of the general public out there on the matter, while the labouring classes, who are more directly interested, have not the means to come over and state their views. We have heard, however, that a prominent member of the Trinidad Working Men's Association is to come over at the Government's expense to give his views, and those of his colleagues, on the matter. If this is so, it reflects the greatest credit on the officials at the Colonial Office that they have shown themselves willing to go to so much trouble and expense in order to learn what they can of the "other side of the case." Such an action will, we feel sure, increase the confidence in them as the responsible governing body of our Crown Colonies.

It was suggested that our Editor, as Life President of this Association, should also give evidence, but as, owing to the pressure of work over here, he has been unable to closely follow the matter for some years, he very rightly asked to be excused from doing so.

It is a pity that the enquiry does not extend to Natal, as, judging from the statements made at a public meeting in London which we attended,[1] reforms are more necessary there than elsewhere, and if the reports one hears from time to time of the way the coolies are treated in Natal are not correct they should be contradicted, for they are inclined more than anything else to adversely affect public opinion on the subject of sending Indian coolies to work in other countries.

In appointing a Protector of Immigrants, anyone with a disposition to an exaggerated idea of his personal importance should not be given the appointment, as such a characteristic does not, as a rule, betoken a nature sympathetic to the low class of coloured labourer with which the official comes into contact, and occasionally into conflict, with. When any dispute arises, especially if it causes the parties to appear before a magistrate, the Protector of Immigrants should be as anxious and determined to prove that his *protégé* is in the right as the prosecution is to prove him to be in the wrong. The coolie, too, must be allowed absolute freedom, in practice as well as theory, to move about when he has, or fancies that he has, cause of complaint. It must rest with the law only, and not with the estate staff, to decide whether

[1] See TROPICAL LIFE for December, 1908, p. 181: "Why Reform is Delayed in San Thomé."

the man is justified or not in leaving the estate for the purpose of lodging a complaint. We have heard a good deal of the well-to-do coolie that returns to India laden with cash and jewellery; but we have also *seen* a good deal of the derelicts left behind that have neither, and are a distinct drawback to the Colony which has to keep them. Sometimes (it is, we are glad to believe, very seldom) these poor wretches succumb to their privations. But could they not be given a start—allowed a piece of land to cultivate, on credit, to be paid back later on? The security is good, for if they die, or are genuine wasters, every hour's work put into that piece of land tends to increase its value, and it does not seem to us fair either to the Colony or the coolie to allow him to be cast adrift when the estate no longer needs his services. As the *West India Committee Circular* truly says, in an excellent article on the subject, "There is plenty of room for East Indians in the West Indies where they can find congenial and profitable occupation."

Cacao Cultivation. No. XVI.

THE YIELD IN BRAZIL.

MR. D. R. O'SULLIVAN BEARE, H.M. Consul at Bahia, reports as follows on the cacao output of Bahia :—

"Three varieties of cocoa are grown in Bahia, being known to the local planters as 'cacao commun,' 'caco Para' and 'cacao Maranhao,' respectively. The three varieties are distinguished chiefly by differences in the size and shape of their respective pods, and by differences in the texture of the rind of the pods. In the matter of the average yield per tree, and of quality of bean, there would seem to be little to choose between the three varieties of tree in question. Indeed, all three kinds are frequently to be seen growing indiscriminately mingled upon the same plantation.

"It is difficult to estimate, with any exactitude, the acreage actually under cocoa cultivation in the State of Bahia at the present time, since no official data are available. It is possible, however, to arrive at an approximate estimate from a consideration of the following data, viz.: the total output of cocoa from the State during the 1907-8 season amounted to about 25,000 metric tons; the average yield of each mature cocoa tree, per season, may be taken to be 2½ kilos of dried beans; the number of cocoa trees planted per hectare may be taken to average 625. Calculation based upon these data would go to show that the total area under cocoa cultivation in the State at the present time amounts to some 16,000 hectares, equivalent to some 40,000 acres, and that there exist some 10,000,000 cocoa trees in bearing.

"The yield per tree, in the case of mature trees, is taken to average 2½ to 3 kilos of dried beans annually. That this average could be substantially increased by the bestowal of a little intelligent care upon the trees admits of no doubt, since the product of one carefully cultivated plantation averages over 6 kilos of dried beans per tree per season, and on an estate in the Belmonte district there are trees that have yielded 15 kilos of dried beans during a season."

Such a calculation as 2½ kilos or 5 lb. (much less 6 kilos and over) of dried beans per tree is so manifestly wrong, that we wrote to a leading Belmonte planter staying on the Continent and laid the case before him, pointing out that it seemed to us the only reliable fact contained in the report is, that 25,000 metric tons was the total output for the 1907-8 season. From our experience of yields in Bahia, even of the full-bearing trees, that is those 7 years old or more, are not likely on an average to yield more than 1 kilo or 2 lb. of dried cacao per tree in a year, and that probably to every tree of this age there are one, if not two others not yet in full bearing.

In answer our friend wrote :—

"The information given does not seem to have been based on a reliable source, or those who drew up the report misunderstood the particulars given them. In the Jequitinhonha (Belmonte) district, in general, you may calculate 1 kilo to 1½ kilos per bearing tree throughout the estate. If 1½ kilos, it is considered very good, and I know estates which do not yield 1 kilo dried cacao per bearing tree.

"One of the principal reasons of this is the difference in the quality of the soil. On no estate do all the trees produce the same quantity, as on every estate there are different qualities of soil, some parts being more or less sandy, some more moist or drier than others, &c. This naturally causes the yield per tree to vary. Taking this into consideration, 1½ kilos, although low, is certainly not below the average. On one estate, however, 5,000 trees have, since they were 7 years old, yielded 15,000 kilos dried cacao. This, of course, gives an average 3 kilos per tree, but the result is so extraordinary and exceptional that it is much commented on, as no one else, so far, has obtained the same result, which is only achieved on account of the following reasons :—

"(1) The soil is of an especial superior character.

"(2) All the *old* cacao estates in Bahia consist of a quality of cacao which we call "cacao commun," a large-growing tree, which gives a very good quality of cacao, but is not a regular heavy yielder.

"The owner of this heavy yielding estate obtained from Ilheos—which, as you know, is a big cacao producing centre—a few pods of other qualities, known as Pará and Maranhao, and planted them. After a few years he had seeds enough to plant one entire field, until he had the 5,000 trees planted referred to. This was at the end of 1893, so that the trees are now fifteen years old. It may interest you to know that the trees are not planted one by one, but two to four trees 'at stake,' or together.

"Another heavy-yielding estate belonging to the same owner gives between 45,000 kilos to 55,000 kilos per 30,000 trees. In 1906 it gave 60,000 kilos, the largest crop it has ever given, but that is an exceptionally managed estate, and is still only 2 kilos per bearing tree—a long way off 6 kilos, or even 3 kilos, mentioned in the report. Individual trees certainly may give 15 kilos, and more. You mention double that quantity in the case of the Para tree in your 'Future of Cacao Planting,' but the average yield mentioned is not known, although there is no estate in the Jequitinhonha district so well looked after and giving so heavy a return as these estates of 5,000 and 30,000 trees.

"For instance, there are estates, still considered good ones, that give much lower returns; one with 45,000 bearing trees gives an average 50,000 to 60,000 kilos; and with another 60,000 trees only give 60,000 kilos—1 kilo per tree. The owner of all these, the best estates mentioned, has altogether 200,000 trees, of which 150,000 are bearing. These 150,000 trees during the last two years gave 172,500 kilos, against 195,000 kilos in 1906; but I consider that they should give, in a favourable year, 225,000 kilos or more, but that would still be

a long way below 2 kilos a tree (dry cacao), and the estates, as pointed out, are exceptional yielders.

"Knowing how keen TROPICAL LIFE is to gather in all details, I will add that the field with 5,000 trees has not a single shade tree among them, nor have any of the 200,000 trees belonging to the same owner. He might therefore argue that "no shade" means increased yields. There is no doubt that what we call Pará and Maranhao cacao trees yield better than the ordinary kind grown. This would all tend to show that the ordinary Bahia estate, especially if badly or indifferently attended, would probably turn out only 1 kilo per bearing tree. The Pará and Maranhao trees are smaller, and the pods and beans flatter. Many therefore consider them to be inferior, but the French turn out a very good manufactured article from the beans. Be this as it may, even if the price rules a shilling or so lower, the increased yield more than makes up for the difference in price obtained for the 'cacao commun.'"

Manihot Rubber Trees.

PART I.

THE NEW MANIÇOBAS.

"Wherever conditions are suitable, the cultivation of *M. Glaziovii* will have to be replaced by that of the Maniçobas from Bahia." —DR. ULE.

ACCORDING to the *Kew Bulletin* (No. 2 of 1908), the German botanists have decided to distinguish the three species of Maniçoba found growing in the States of Bahia and Piauhy by the following designations, viz.:—

The so-called Jiquié[1] Maniçoba = *Manihot dichotoma.*
" " São Francisco Maniçoba = *M. heptaphylla.*
" " Piauhy Maniçoba = *M. piauhyensis.*

The seeds of the first are said to germinate very readily, and a sample of so-called Jiquié rubber (obtained from *M. dichotoma*) and a sample of so-called Rio São Francisco rubber (obtained from *M. heptaphylla*) are both reported to be rubbers of good quality.

M. dichotoma does not form quite so large a tree as Ceará (*M. glaziovii*), and is from 5 to 12 metres (16 to 39 ft.) in height; the stem also does not become so thick, and the bark is thinner and usually paler; the smaller leaves, and the large, long seeds, afford the most important characters for distinguishing this species from *M. glaziovii.*

M. heptaphylla and *M. piauhyensis* are quite different in habit from *M. dichotoma. M. heptaphylla* is 3 to 8 metres (10 to 26ft.) in height, with blackish-brown bark and beautiful purple twigs; the seeds are roundish, as in *M. glaziovii*, but larger and paler than in that species.

M. piauhyensis is closely allied to *M. heptaphylla*, but forms somewhat smaller trees, from 2 to 5 metres (6½ to 16 ft.) in height; the seeds can scarcely be distinguished from those of *M. piauhyensis.*

Collection of Rubber.—The mode of collection of rubber from these three specimens differs from that in use for *M. glaziovii.* The latex begins to coagulate as soon as collected. With careful methods a tree may be tapped from three to ten times. From 10 to 100 grammes of dry rubber may be obtained from a single tapping.

Plantations.—With regard to tapping, *M. piauhyensis* is ready in the third year, and the other two species may be tapped in their fourth year of growth. The yield of rubber from a single tree of *M. dichotoma* in one year can be reckoned at 100 to 200 grammes with present methods, and this is equivalent to 200 to 300 kilogrammes per hectare. The annual yield of rubber for single trees of *M. piauhyensis* and *M. heptaphylla* is from 500 to 1,000 grammes, which corresponds, roughly, to about 1 ton per hectare.

In the plantations, which are laid out in a primitive manner, the seeds are planted in rows 2 metres apart, making 2,500 trees to the hectare (2·47 acres). The cultivation of Ceará rubber (*M. glaziovii*), which has been pursued with more or less profit in many cases, has had to be given up in some places owing to its failure to pay, due partly to the injury caused by wind and by careless tapping, and also to the hardness of its bark.

The advantage of the three species from Bahia and Piauhy is that they are less liable to the injuries just mentioned, and that, speaking generally, the yield of rubber is far higher than in *M. glaziovii.* One hectare planted with *M. glaziovii* is estimated to yield 300 kilos, whilst 1,000 kilos per hectare is the amount reckoned for *M. piauhyensis* or *M. heptaphylla* when planted in suitable positions. Such a yield exceeds even that of *Hevea brasiliensis.* As to the relative values of *M. piauhyensis* and *M. heptaphylla,* the former yields a slightly more valuable rubber, and the tree is ready for tapping somewhat earlier. On the other hand, the latter appears to be a longer-lived tree.

Comparing the Maniçoba plants with Hevea, Ule remarks that there is no doubt that the rubber of *H. brasiliensis* is of better quality, possesses greater elasticity, and obtains the higher price; but in spite of this the characteristics of these Manihots make them well worthy of cultivation.

One of the conclusions drawn by Ule from the facts set out is that, wherever conditions are suitable, the cultivation of *M. glaziovii* will have to be replaced by that of the Maniçobas from Bahia. The question as to which of the three species is to be preferred depends chiefly on the nature of the soil, since they grow under nearly similar climatic conditions.

In a rather firm, loamy soil *M. dichotoma* is the most suitable species, whilst *M. heptaphylla* and *M. piauhyensis* should be planted in a light sandy soil. *M. dichotoma* has the advantage over the other two species in that its seeds germinate especially easily.

H. brasiliensis is obviously the most important plant for luxuriant tropical regions, whilst *M. heptaphylla* and *M. piauhyensis* must be regarded as the rubber plants of the future for dry and less fertile districts.

In planting,[1] the nursery beds may be prepared in the ordinary way for all the varieties. Plant out the seeds about 4 in. apart; and, in dry weather, water to the depth of about ¼ in. twice a day, in the morning and evening. Shading is not necessary. *M. dichotoma* seed begins to germinate in about a fortnight, but the other two varieties take three to four weeks and over. Some of the seeds take over eight weeks to germinate, and great care should be taken to prevent rats, squirrels, &c., from eating the sprouted seeds and seedlings.

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[1] Also spelt Jequié.

[1] Messrs. J. P. William and Bros, of Heneratgoda, Ceylon, are constantly importing fresh seeds of the above new varieties. They even have a small number of two-year-old trees of *M. piauhyensis* and *M. heptaphylla* in their low-country plantation, about 100 ft. above sea-level, called Kola at Veyangoda, and at their up-country plantation, 2,000 ft. up, known as the Ellawala Group at Nawalapitiya, they are growing well. Some of the trees have branched at 4 to 5 ft., and some at 6 to 8 ft., but none have flowered as yet.

Cotton.

THE following were the prices for Cotton in London on June 10th, according to Messrs. Slann and Davies:—

	Good Fair.	Good.	Fine.	Superfine.	Good 1908. (Compare)	Good 1907.	
	d. d.	d. d.	d. d.	d.	d. d.	d. d.	
Surat kinds* ...	$4\frac{9}{16}$ to $4\frac{27}{32}$	$4\frac{13}{16}$ to $5\frac{1}{8}$	$5\frac{1}{16}$ to $5\frac{3}{8}$	—	$4\frac{13}{16}$ to $5\frac{5}{16}$	$4\frac{7}{8}$ to $6\frac{1}{16}$	per lb.
Madras	5 to $5\frac{1}{8}$	$4\frac{11}{16}$ to $5\frac{3}{8}$	—	—	$4\frac{1}{8}$ to $5\frac{3}{16}$	5 to $5\frac{7}{8}$	—
Bengal	—	$4\frac{3}{8}$	$4\frac{5}{8}$	$4\frac{3}{4}$	$3\frac{7}{8}$	4	—
Assam	—	$4\frac{3}{4}$	$6\frac{3}{8}$	$6\frac{3}{4}$	$4\frac{1}{4}$	$5\frac{1}{4}$	—
China	—	5	$5\frac{1}{2}$	$5\frac{3}{4}$	$4\frac{3}{8}$	$5\frac{1}{8}$	—
West Indian ...	$5\frac{1}{4}$	$5\frac{1}{2}$	6	$6\frac{1}{4}$	$6\frac{5}{8}$	$8\frac{1}{4}$	—
Sea Island ...	7	$9\frac{1}{4}$	$13\frac{1}{2}$	16	10	14	—
Australia	6	$6\frac{3}{8}$	—	—	$6\frac{7}{8}$	8	—

* Liverpool quotations.

The Washington Agricultural Bureau issued its Report on the 4th inst., and gave the average crop condition as 81·1, against 79·7 in 1908, and 70·5 in 1907, and the total acreage planted as 31,918,000, against 33,370,000 last year. This Report has not had much effect upon the market, which on the whole has been quiet and rather easier, "Futures" closing 1 to 6 points, and spot 4 points down, the quotation for "Middling" American being now 5·79d. Manchester accounts describe a quiet market, with a moderate business doing. Shippers of East Indian have been willing to meet buyers in some descriptions, and more business has been put through.

The import into Liverpool this week amounts to 80,449 bales; since September 1st, 3,988,893; same week last year, 39,000; last year's total, 3,383,459 bales. The estimated Sales amount to 41,000 bales. Middling American is quoted at 5·79d. per lb.; last year, 6·58d.; 1907, 7·13d.

The latest quotations of Americans for delivery, basis middling, any port, G.O.C., were:—

	June 10th.	Last Week.	Last Year.
	d.	d.	d.
June	$5{\cdot}66\frac{1}{2}$	$5{\cdot}67\frac{1}{2}$	5·80
June—July	$5{\cdot}66\frac{1}{2}$	$5{\cdot}67\frac{1}{2}$	5·74
July—Aug.	$5{\cdot}70\frac{1}{2}$	$5{\cdot}74\frac{1}{2}$	5·71

Movement of American Cotton since September 1st:—

	1908-9.	1907-8.	1906-7.
Brought into sight	13,073,000	10,835,000	13,038,000
Exports from United States since September 1st—			
To Great Britain	3,371,000	2,753,000	3,663,000
To Continent, &c.	4,338,000	4,027,000	4,206,000
Total crop	—	11,571,966	13,510,982

Coffee.

By Messrs. C. M. AND C. WOODHOUSE.

THE market has been plentifully supplied during the past week, ending June 12th, and with a fair demand prevailing generally steady rates have been obtained for all descriptions. East Indian sold at fully recent prices, and Jamaican met with a ready sale. Costa Rica, of which more than half the sales consisted, sold with competition, desirable quantities realising full values, but foreign-cleaned were difficult of sale. Other Central American descriptions were also in demand, and the good quantities offered were disposed of at steady prices. The stocks in the principal ports of Europe on June 1st, according to Messrs. Düüring and Zoon's report, were 8,265,000 bags against 9,461,000 bags and 7,578,000 bags in 1908 and 1907 respectively, being a decrease for the month of 384,000 bags against a decrease of 151,000 bags at the same time last year. The visible supplies show a decrease for the month of 492,000 bags against a decrease of 405,000 bags in 1908, the totals on June 1st being 12,815,000 bags in 1909, 14,591,000 bags in 1908, and 16,350,000 bags in 1907. There is no business doing in market for "futures," and prices show little change from those ruling last week. We quote:—

		1909. To-day.	June 3rd.
London ..	Santos, Sept. delivery.	30s. 9d.	30s. $10\frac{1}{2}$d.
New York ..	No. 7 Rio ,,	6·00 cents	6·10 cents.
Hamburg ..	Santos ,,	$32\frac{1}{2}$ pf.	$32\frac{1}{2}$ pf.
Havre ..	Santos ,,	$42\frac{1}{4}$ francs	$42\frac{1}{4}$ francs.

The receipts at Rio and Santos from July 1st, 1908, to June 9th, 1909, were 11,967,000 bags against 10,012,000 bags and 18,971,000 bags in the two previous seasons respectively.

Sales include the following, viz.:—

East India.—Mysore.—46s. to 47s. 6d. for smalls, 49s. 6d. to 55s. 6d. for low middling to good middling, 57s. 6d. to 63s. 6d. for good middling bold.

Coorg.—54s. for middling, 59s. for bold.

Neilgherry, &c.—45s. to 51s. 6d. for smalls, 54s. 6d. to 57s. 6d. for middling to good middling, 56s. 6d. to 68s. 6d. for middling to good bold.

Nelliampathy.—44s. 6d. to 49s. for smalls, 51s. 6d. to 54s. 6d. for low middling to middling, 54s. to 60s. 6d. for middling to good middling bold, 70s. 6d. for extra bold.

Travancore.—46s. to 46s. 6d. for smalls, 52s. 6d. for middling, 57s. to 58s. for good middling bold.

Wynaad.—52s. to 55s. 6d. for middling to good middling, 57s. to 65s. 6d. for good middling to good bold.

Naidoobatum.—47s. to 53s. 6d. for smalls, 54s. to 60s. for middling to good middling, 60s. to 66s. for bold, 70s. to 90s. for extra bold.

East India.—Cleaned in Ceylon. 52s. for smalls, 75s. 6d. to 76s. for medium, 82s. to 97s. for bold to extra bold.

Jamaica.—200 barrels and bags, at 54s. 6d. for smalls, 41s. to 50s. 6d. for good to fine fine ordinary, 74s. for good middling, 94s. 6d. for good bold blue.

Costa Rica.—7,600 bags at 45s. 6d. to 58s. 6d. for

ordinary to fine smalls, 44s. 6d. to 54s. 6d. for good to fine fine ordinary, 56s. to 61s. 6d. for low middling to middling, 62s. 6d. to 74s. for good to fine middling, 58s. 6d. to 65s. 6d. for low middling to middling bold, 68s. to 80s. for good middling to fine bold.

Guatemala.—3,100 bags at 44s. to 47s. for smalls, 38s. to 38s. 6d. for ordinary brownish, 47s. to 55s. 6d. for fine ordinary to good middling, 54s. to 57s. 6d. for middling to good middling bold, 103s. 6d. for Maragogipe.

Salvador.—1,850 bags, at 46s. to 48s. 6d. for smalls, 44s. 6d. to 56s. for fine ordinary to good middling, 55s. 6d. to 62s. 6d. for good middling bold, 94s. 6d. to 109s. for Maragogipe.

Nicaragua.—2,500 bags, at 42s. to 43s. 6d. for good to fine ordinary foxy green, 40s. to 47s. for smalls, 44s. 6d. to 51s. 6d. for fine ordinary to middling, 52s. to 63s. for good middling, 54s. to 64s. 6d. for middling to good middling bold, 68s. to 75s. for good to fine bold.

Vera Paz, &c.—165 bags, at 46s. to 48s. 6d. for smalls, 54s. 6d. to 58s. for low middling to middling, 74s. to 74s. 6d. for good middling bold, 105s. for Maragogipe.

Mexican.—520 bags, at 40s. to 47s. for smalls, 46s. to 52s. for fine ordinary to good middling, 51s. 6d. to 61s. 6d. for common to good middling bold.

Colombian, &c.—500 bags, at 48s. 6d. to 54s. for low middling to good middling, 54s. 6d. to 56s. for bold.

Sugar.

ACCORDING to Mr. C. Czarnikow (June 10), the Board of Trade Returns for the United Kingdom show that deliveries were 91,000 against 167,000 tons, which fully bears out our anticipations, which means that 100,000 tons more sugar is held invisibly than in 1908 or 1906, which we propose to add to stocks, instead of last month's 170,000 tons, in order to meet an exceptional situation, which we hope will not occur again. The official stocks, which showed 130,000 tons deficiency in April, are now only 60,000 tons below last year, and British refined stocks increased by 17,500 tons, though refiners worked less. Imports from Russia and America were almost *nil*, but notwithstanding large excess of invisibles held here, some owners of May beet consigned raw sugars unsold to this country, the imports of German raw sugar having been 60,000 against 19,000 tons. Yet the Hamburg stock increased 5,000 instead of decreasing 26,000 tons in May, and a further increase of 11,000 against 3,000 tons decrease was registered first week in June, though the German exports in May are only 64,861 against 88,100 tons, the figures for Austria alone not showing much variation.

Under the circumstances not much activity was to be expected, but prices only gave way a fraction, August moving from 10s. 8½d. to 10s. 7½d. to 10s. 8d., new crop remaining almost unchanged. The crop has made fair progress, but remains behind last year; the weather was warm, but there was less moisture in Central and Eastern Europe than in France, Belgium and Holland. No conclusions can as yet be drawn therefrom.

A steadying feature is the absence of Russian imports and the delay which occurs in Java shipments owing to rainy weather; the May shipments from there were 2,550 against 12,000 tons West, 13,680 against 9,400 tons East. This mostly affects American supplies, but owing to the larger Cuban crop, and notwithstanding larger meltings, America still diverts all non-preferential cane from Brazil, Domingo, &c., to Europe, whilst attracting it last year. We have to slightly raise the Cuban crop estimate again on basis of Guma's monthly figures for all ports of 1,332,000 tons.

The American market has remained quiet throughout the week, but quotations have recovered to 3·92 cents for 96 per cent. Centrifugals = 10s. 3d. c.i.f. for non-preferential 96 per cent. = 9s. 3d. f.o.b. Hamburg for 88 per cent. net beet. The landings in the three ports for the week were 34,000 tons, and with meltings of 52,000 tons, stocks are reduced to 388,000 tons.

In the United Kingdom transactions in cane sugar have been upon a limited scale, but there is a fair demand for refining sugars, especially for arrived parcels, which have sold at full rates. Grocery crystallized is quiet at previous values. From can-producing countries there is little news of interest. The Louisiana crop has derived considerable benefit from recent rains, and prospects are very promising. In Cuba there are only eight centrals still grinding; the growing crop looks well.

The total transactions of British West India for the week amount to about 8,000 bags, including Crystallized Demerara, middling palish, 15s. duty paid, middling to good middling yellow 15s. 1½d. to 15. 3d., fine palish 16s. 9d. to 17s. Crystallized Trinidad, low greyish small grain 14s. 6d. to 14s. 7½d., low middling yellow 14s. 9d., middling ditto 14s. 10½d. to 15s., good middling yellow 15s. 3d.

At auction and since, 1,678 mats Mauritius Syrups sold, low brown and grey 9s. 10½d. to 10s. 3d., a few mats coloury 10s. 6d. to 11s. duty paid.

250 pockets good middling Guatemala greyish Syrups sold at 12s. 9d. duty paid.

Fine palish yellow San Salvador Syrups sold at 16s. duty paid.

In Liverpool: 4,551 bags grainy Peruvian sold at 12s., Syrups at 9s. 4½d to 10s. 6d., ex quay in bond. 1,000 bags grainy Domingos at 11s. 9d. basis 96 per cent. polarization, and 1,000 bags 98 per cent. polarization at 11s. 10½d telquel, both quay terms. 1,800 tons Brazilian Centrifugals, due New York, sold to Liverpool at 10s. 11¼ c.i.f.

Rubber Shares.

THE Rubber Share Market during the week ending June 3rd for Malay and Ceylon concerns showed a very firm front after the holidays, and a large business was done, in many cases with an improvement in prices. The raw material is also advancing, and everything forecasts a very good time for rubber shares, so that higher prices may be expected for some time to come.

Between June 3rd and 10th the approach of the settlement rather restricted business, but the market remained fairly active during the week, prices on June 10th, according to Messrs. Russell, Grant & Co., standing as follows, compared with those given last month :—

	May 13th	June 10th
Bukit Rajah	7¾ ..	7⅞
Cicely Estates Co.	8⅜ ..	—
Highlands and Lowlands ..	28/- to 29/- p. ..	34/- p.
Klanang Produce Co. ..	4½ ..	5
Lanadron Estates	21/6 p. ..	25/8
Linggi Plantations ..	20/3 ..	22/-
Perak Rubber Co.	35/- ..	35/- and over
Selangor Rubber Co. ..	27/- to 28/6 ..	28/-
Shelford Rubber Co. ..	20/- ..	24/-
United Serdang Rubber Co.	46/7 ..	50/-
Vallambrosa Rubber Co. ..	22/6 ..	22/6

p. = premium.

The India-rubber Market.

By Messrs. S. FIGGIS AND Co.

Plantation jumped up 6d. *lb. in a day, Fine Ceylon Biscuit and Sheet* 6s. 7¾d. *lb.*

THERE was an eager demand for rubber at the end of May and further very large sales of all descriptions took place.

Pará Fine Hard.—Spot and forward realized on delivery up to 5s. 7½d. (a rise of 1d. to 2d. lb.).

Fine Soft.—Spot and forward realized on delivery up to 5s. 6½d.

Caucho Ball.—Several hundred tons changed hands spot up to 3s. 8d. June — July, 3s. 8½d.; August — September, 3s. 9½d.; September—October, 3s. 10d.

Plantation was sold privately pretty freely at a little over last auction's values, but at the auctions on May 28th, in face of a very active competition, prices advanced 2d. to 3d. per lb. and sold as follows :—

Plantation Malay.—Sheet, smoked ribbed, 5s. 11d. to 5s. 11½d.; fair to fine, 5s. 9d. to 5s. 9½d.; mixed, part pressed, 5s. 5½d. to 5s. 8d. Block, Lanadron fine pale, 5s. 11¾d. Crêpe, very fine pale, 5s. 9d. to 5s. 10d.; good to fine pale, 5s. 8d. to 5s. 8½d.; fair to good palish, 5s. 7d. to 5s. 7½d.; light brown and grey, 5s. 4¾d. to 5s. 6¼d.; clean dark brown, 5s. 3d. to 5s. 6d.; dark and specky, 4s. 11d. to 5s. 2½d. Scrap, fair to fine, 4s. 10d. to 4s. 11½d.; mixed, 4s. 4d.

Rambong.—Crêpe, fine, 4s. 10d. to 5s. 2¾d. Scrap, 4s. 2d. 12 tons offered.

Ceylon.—Sheet and biscuit, fair to good pale, 5s. 8½d. to 5s. 9½d. Worms, 5s. 8¼d. Crêpe, fine pale, 5s. 8d.; fair pale, 5s. 6¾d.; clean brown, 5s. 4d .to 5s. 6d.; dark brown, 5s. to 5s. 3d.; black soft, 4s. 4d. to 4s. 9¼d. Scrap, fair to fine, 4s. 11½d. to 5s. 0½d.; mixed, 4s. 3d. to 4s. 7½d.

Mollendo sold, fine, 5s. 5¼d. to 5s. 5½d.; entrefine, 5s. 3d. to 5s. 3½d.; coarse, 4s. 10d. to 4s. 11d.

Manigoba.—Good clean, 3s. 8¾d. to 3s. 9d.

Mozambique sold, fair to good red ball, 4s. 0¾d. to 4s. 2½d.

Abyssinian.—Good sheet sold at 3s. 3d. to 3s. 3½d.

The market continued active during the next week ending June 4th, and prices advanced rapidly, with manufacturers buying :—

Hard Fine.—Near sold up to 5s. 11d.; forward delivery at 5s. 10½d.

Soft Fine.—Scarce, small sales up to 5s. 8¼d, but buyers now at 5s. 9d.

A large business has again been done in Caucho (Castilloa) ball at advancing prices in Upriver f.a.q. Sales of near delivery up to 3s. 11d., and distant 3s. 11½d.

During the week ending June 11th the market continued to advance, with considerable business, buyers of near fine Pará paying 6s. lb., and of entrefine up to 5s. 10d.; soft fine, near up to 5s. 10½d.; negroheads, scrappy (Manaos) sales at 4s. 4d.; cametas at 3s. 5½d. A large business has been done in Caucho ball, including spot (Upriver, f.a.q.) 3s. 10½d, and forward delivery August—September at 4s. to 3s. 11d.

At the sales on June 11th, 95 tons plantation kinds were offered, and all sold at about 6d. advance on last auction's prices, smoked sheets realizing up to 6s. 6¼d., against 5s. 11½d. as above, and Ceylon up to 6s. 7¾d. Prices included :—

Plantation Malay.—Sheet, smoked part ribbed, 6s. 6¼d.; fair to fine, 6s. 2¾d. to 6s. 3½d.; mixed, part pressed, 5s. 6d. to 5s. 10d. Crêpe, good to fine pale, 6s. 3½d. to 6s. 4¼d.; fair to good palish, 6s, 1d to 6s. 3d.; light brown and grey, 5s. 10¾d. to 6s.; clean brown, part dark, 5s. 8½d. to 5s. 10¾d.; dark brown, part specky, 5s. 3½d. to 5s. 6¾d. Scrap, fair to fine, 5s. 1¾d. to 5s. 4¼d.

Ceylon.—Biscuits and sheets, 4 cases very fine pale, 6s. 7¾d; fair to fine, 6s. 3d. to 6s. 3½d.; Ceara pale, 6s. 1d. to 6s. 3d. Worms, fair to good pale, 5s. 10d. Crêpe, fine pale, 6s. 4¼d.; fine palish, 6s. 0¼d. to 6s. 2½d.; clean brown, 5s. 9½d. to 5s, 11¼d.; dark brown, 5s. 2d. to 5s. 7d.; black soft, 4s. 8d. to 5s. Scrap, fair to fine, 5. 1½d. to 5s. 4¾d.

Mollendo.—Fine, 5s. 8½d.; entrefine, 5s. 6½d.; coarse entrefine and virgin, 5s. 3d.

Central America and Columbian.—Clean brown scrap, 3s. 10½d. to 3s. 11d.

Mozambique.—Small reddish marbles, 3s. 5¼d. to 3s. 7½d. Lamu ball, 3s. 9d.

Madagascar.—Mixed slab, pasty, 3s. 9d. to 3s. 9¼d.

Assam.—Ordinary red, 4s. 3d.; grey, 4s. 1d.; fine red plant, 5s. 1½d.

Tonquin.—Red, part heated, 3s. 6¾d.

Pará rubber statistics for the month of May (tons) :—

	Pará.	Caucho.	1909.		1908.	1907.	1906.
Receipts at Pará ..	1,480	860	= 2,340	agst	3,210	2,620	2,320
Shipments to Europe	730	810	= 1,540	,,	1,580	1,830	1,640
,, America	1,020	140	= 1,160	,,	1,950	1,090	850

Crop statistics, June 30th, 1908, to May 31st, 1909 :—

		Pará.	Caucho.	1908-09.	1907-08.	1906-07.	1905-06.
Pará Receipts	1908-09	28,910	7,610	36,520	34,990	36,500	32,840
	1907-08	28,110	6,880				
,, Shipts.,	Europe	12,990	5,250	18,240	20,690	18,190	19,275
,, ,,	America	15,810	2,320	18,130	13,560	17,800	13,585

Tea.

By Messrs. WM. JAS. AND HY. THOMPSON.

FEW noteworthy features have characterized the week's auctions (ending June 12th), for the Indian sales, although they have passed with a distinctly firm tone, are becoming too small to attract much attention, and there is a disposition on the part of buyers to await the arrival of the new crop. The slight falling off in quality of nearly all Ceylon invoices has had but little effect on prices, and the large auctions sold freely at fully late quotations.

The sales of Indian, in spite of a fortnight's cessation, only reached 8,985 packages, mainly consisting of Southern Indian and ex-Calcutta sales teas. The total offered for the season to date amounts to 1,455,111 packages, against 1,470,663 packages in 1907-8.

A steady demand characterized the auctions and previous rates for useful medium sorts were well maintained. Fair black Pekoe Souchongs passed at unchanged quotations, although some invoices of a red and stalky character showed a natural slight falling off. Southern Indian teas were well represented and sold freely at about late values. A small invoice from Central Africa was offered, the average price bid being 5d. per lb. For next sales only 9,331 packages are in print; of these 378 packages are new season's Darjeelings.

The averages worth noting were from Southern India, viz.: Daverashola and Prospect, 8½d. per lb.; Kolie Kanum and Ossington, 8d. per lb.

For the whole sale the average realized was 7d. per lb.

Calcutta telegrams.—The first sale of the season was

held on Wednesday, 9th inst., 13,000 packages being sold. Good qualities realized extreme rates, medium grades were in steady demand, but common descriptions were rather neglected.

As regards the crop, immediate prospects are fair, as weather conditions in most producing districts are normal for the time of year. Outturn last month was poor in Upper and Lower Assam, Southern Cachar and Sylhet, good in Darjeeling and the Eastern Dooars and normal elsewhere. Red spider blight has made its appearance in some parts of Cachar.

During the second half of May 783,000 lb. were entered for export to the United Kingdom from Calcutta and Chittagong, against 1,341,000 lb. last year, making the total from April 1st to May 31st, 1909, 1,405,000 lb., compared with 1,942,000 lb. for the same period in 1908.

Owing to the accumulation during the Whitsun recess, a record sale of some 46,400 packages Ceylon was advertised, which was spread over two days.

Notwithstanding a general falling off in quality coupled with the unusually heavy shipments from Colombo for last month of some 14,500,000 lb., the sale on both days passed with a steady tone, the good medium kinds being well competed for: Fine liquoring descriptions were scarce, and the few on offer sold at very firm rates. A fair number of export orders helped the sale of useful Orange Pekoes, but brokens between 7d. and 8d. were occasionally easier to buy, as were the poorer leaf grades which occasionally marked a rather lower quotation. Common dusts were not wanted and were lower. The following few averages are noteworthy: Goatfell, 10¾d.; Cranley, 10½d.; Caledonia and Portmore, 10¼d.; Kotiyagalla, 10d. The whole sale resulted in an average of 7⅝d. Since January 1st the quantity offered to date amounts to 576,196 packages, compared with 516,581 packages in 1908.

The London Cocoa Market.

By The Editor.

The cause of the proposed duty under the Payne tariff on cocoa entering the United States having been dropped, or showing every sign of being so, is explained by our contemporary the *Confectioners Journal* of Philadelphia, which reports that Mr. Louis Runkel, Chairman of the committee representing the American manufacturers of cocoa products, succeeded upon March 30th in securing from the House of Representatives a reduction upon cocoa beans from 4 cents to 3 cents per pound. And more recently the Senate upon the plea of the committee, placed raw cocoa, logically, upon the free list. This item has yet to pass the ordeal of the Conference Committee, but when it is reached a strong representation of the industry will be on hand to secure the best possible conclusions.

The month, as far as cocoa is concerned, has been a very quiet one. The holidays, and the reaction after the heavy American and Continental purchases earlier in the year, have both caused a marked difference in the position of buyer and seller. Then the buyer was the most anxious of the two, now it is the seller who wishes to be up and doing, and sends letters and wires to every possible buyer, in the hope of waking them up from their lethargy. In the face of this, prices on the whole, I consider, have remained fairly steady, although, of course, the tendency is a lower one. I am sorry to see another substantial drop in the deliveries for home consumption in the United Kingdom. This, following on the decrease in April, has caused us, as the figures given below show, to have only a total increase of 1,239 tons over last year, instead of the 2,500 that we could boast of at the end of March. Here are the figures:—

Raw Cocoa only—	Landed.	Delrd. H.C.	Exported.	Stock, May 31.
Jan.-May, 1907—	12,391	8,843	2,183	3,493 tons
,, ,, 1908—	15,156	9,723	2,311	5,838 ,,
,, ,, 1909—	19,157	10,962	2,615	10,868 ,,
Increases	4,001	1,239	304	5,030 ,,

In May, only 1,611 tons were delivered for home consumption against 2,324 tons last year, and 2,068 tons in 1907.

The European consumption for the first four months of the year, January-April, works out as follows:—

		1909	1908	1907	
Germany	.. 4 months	15,054	10,957	13,564	Tons (Engl.)
France ..	.. 4 ,,	7,384	6,315	7,882	,,
Holland ..	.. 4 ,,	8,766	7,005	5,757	,,
Belgium ..	.. 4 ,,	2,486	2,140	1,432	,,
U.K. ..	.. 4 ,,	9,351	7,399	6,775	,,
		43,041	33,816	35,410	,,
Add U.S.A.	.. 3 ,,	12,360	8,482	12,920	,,
Total	.. ..	55,401	42,298	48,330	,,

It will be remembered that America imported 307,000 bags during January-April, of which 165,000 bags were in April alone. On this basis the American "ton" import for the four months should work out at about 25,000 tons, as compared to the 12,360 shown above at the end of March, making the four months' total of the six countries amount to about 68,000 tons. From now, however, the increase in the United States will move in more regular lines, and as the total imports for last year were only 40,568 tons, against 35,250 tons in 1907, one must not expect too much from America during the remaining months of the year.

Coming to the growths, Guayaquils continue to come forward in astonishing quantities, the total receipts to the end of May being 359,000 quintals, against 631,250 quintals as a twelve months' total export last year, and 398,500 quintals during 1907. This year's heavy output following, as it does, on far and away the biggest record shipment (1908) from Guayaquil, is quite remarkable. The previous record (1904) only amounted to 536,250 quintals.

The San Thomé labour controversy came to life again in the *Times* at the beginning of the month. This time it was Portugal who had a retaliatory "spit-out" at us, followed by a rather poor letter from Mr. Nevinson in reply. Meanwhile, I notice a sale of 100 bags of San Thomé at 56s. was publicly reported, the first since the boycott was pronounced, so maybe we shall hear of others. The stock at Lisbon on May 31st was returned as being 76,770 bags, against 163,666 bags last year, and 42,300 bags in 1907. Grenada hopes to turn out a record, though as this means over a 67,000 bag crop the island will have to wake up to do so. The general idea of Trinidads is that nothing important in the way of output can be looked for until the end of the year, and if between now and then the shipments are heavy it will be because some of the large shippers had the cocoa in store.

As to available supplies, there seems to be plenty to go round with a little to spare; at the same time, although

we cannot expect to always have the high prices of 1907, the present level and immediate prospect of prices still show a very good return to the planter, in face of the increased output on all sides. Individual planters may not be enjoying as heavy a crop as they would like, or as even they feel entitled to expect, but in many of these cases I am quite sure soil exhaustion, and lack of cultivation, of air and light (all preventible causes), will be found to be the reasons of the restricted output. Several planters who have written us on the matter and followed the advice we gave them, are now satisfied that what we say on these points is true.

The combined stock of London and Havre, according to the following figures, amounted to 286,910 bags, against 222,129 bags last year, and 114,115 bags in 1907, say :—

London, June 5th.	1909. Bags.	1908. Bags.
Trinidads ..	16,465	20,339
Grenadas ..	19,126	13,512
Other W.I. ..	5,205	3,680
Ceylons & Javas	19,968	13,156
Guayaquils ..	15,790	8,512
Brazil & Bahia	1,730	1,254
African ..	24,419	9,672
Other foreign..	9,694	8,654
Total ..	112,397	78,779

In 1907, 53,725 bags.

Havre, May 31st.	1909. Bags.	1908. Bags.
Para	8,479	3,793
Bahia	16,567	15,130
Venezuela ..	34,557	31,072
Trinidad ..	30,643	33,234
Other W.I. ..	7,983	10,506
San Thomé ..	8,165	1,224
San Domingo..	15,925	4,470
Haiti	10,631	13,627
Accra	14,816	12,155
Guayaquil, &c.	26,747	18,139
Total ..	174,513	143,350

In 1907 60,390 bags.

As is not unnatural, in face of the heavy output, Guayaquils are comparatively cheaper than other growths. Of the two centres, Guayaquil and the West Coast of Africa, the latter on the whole perhaps has maintained its value the best.

The volume of business during the past four weeks has, however, been small, no public sales being held either on June 1st (Whit-Tuesday) or the Tuesday preceding. In spite of having this three weeks' break, the auctions on June 8th went off very quietly. A few Trinidads changed hands at prices about on a parity with what had been sold during the holidays, and some 2s. below the level of sales held on May 18th. Grenadas and "Other W. I." were not quite so firm as on that date, but what sold, between 300 and 400 bags, did not show so marked a drop. Good to fine Ceylons do not seem to be wanted just now, but "native" sell rather more easily than was the case a month ago. Values on June 12th ran as follows :—

Trinidads.—Fine marks, 60s. to 61s.; good middling to good red, 56s. 6d. to 59s. 6d.; middling red, 55s. 6d. to 56s.

Grenadas.—Good to fine, 53s. to 55s., perhaps for picked lots 56s.; ordinary to good fair, 49s. to 52s.

Jamaicas.—Good red, 53s. to 55s.; ordinary unfermented to fair fermented, 48s. to 52s.

St. Lucia.—Good to fine bright, 55s. to 57s.; common unfermented, 48s. to 50s.

Costa Rica.—None were sold. Good red is worth 54s.; dullish, 53s.

San Thomé.—Fine fermented, 56s.

West Coast of Africa.—Rather difficult of sale. Good bright should be worth 50s. to 52s.; fair to good fair, 46s. to 48s.

Guayaquils.—Arriba has been selling at 66s. and Machala at 59s. 6d. to 60s. Nominal values are given as being: Fair to good Arriba, 63s. to 68s.; Caraquez and Machala, 59s. to 61s.

Ceylons.—Very little doing in "estate"; good to fine bold last sold at 70s. to 75s.; good "native," 56s.

EMIL PASSBURG, BERLIN,

Manufacturing Engineer.

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Tropical Life:

A Monthly Journal devoted to the Interests of those living, trading, holding property, or otherwise interested in Tropical and Sub-Tropical Countries.

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"Tropical Life" Prize Fund for the best Essay on The Fermentation of Cacao.

The Earl of Crewe (Secretary of State for the Colonies) expresses his interest in the raising of the Fund.

WE shall be glad to receive your £5, if not already sent.

Owing to the run on our June number, which exhausted the issue within three days of publication,[1] and so prevented our sending copies with particulars of the competition to all those whom we desired should receive them, we reprint the full text of the competition again this month. It is particularly gratifying to report that two leading planters, one in Jamaica, the other in Grenada, have voluntarily subscribed towards the fund, thus showing that the planters, as well as the manufacturers and the tropical agricultural press, are much interested in the matter.

The following firms have shown their interest in this matter by subscribing £5 to the Fund :—

Messrs. Cadbury Bros., Ltd., Bourneville.
" J. S. Fry and Sons, Ltd., Bristol.
" Rowntree and Co., Ltd., York.
" Van Houten and Zoon, Holland.
" W. Van der Berg, Holland.
" Suchard, S. A., Neuchatel.
" J. H. de Bussy, Holland.
" Walter Baker and Co., Ltd., Boston, U.S.A.
" H. O. Wilbur and Sons, Inc., Philadelphia, U.S.A.
" Wm. Porter and Co., Liverpool.
" The Sarotti Cocoa Manufg. Co., Ltd., Berlin.
Der Tropenpflanzer, Berlin.
Deutsche Kautschuck-gesellschaft, Berlin.
Kakao-Einkaufs-Gesellschaft, Hamburg.
The Editor of TROPICAL LIFE, London.

We recently wrote calling the attention of the Secretary of State for the Colonies to the scheme for encouraging further research work in this matter, and expressed the hope that the tropical experts at home and in the Colonies would take a prominent and successful part in the competition, and received the following reply: "I am directed by the Earl of Crewe to acknowledge the receipt of your letter of the 17th instant, calling attention to a fund for awarding a prize to the best treatise on the causes of the changes which take place in cacao beans during the process of fermentation. . . . I am to inform you that Lord Crewe sympathizes with every movement to improve the technical process connected with tropical agriculture, and is interested to learn that this fund is being raised.

"I am, Sir,
"Downing Street, "Your obedient servant,
"*May* 21*st*, 1909." "R. L. ANTROBUS.

[1] As we continue to receive orders for the December (1908) issue, we would take this opportunity to state that we cannot possibly execute same, for having but six copies left we are reserving them to complete bound volumes for 1908.

We submitted to Mr. William Fawcett, ex-Director of Agriculture at Jamaica, a rough draft of the various points that we wish to be included in the essay to be sent in, and he has very kindly sent us the following, which we feel cannot be improved upon. Intending competitors can therefore take it as a basis on which to work, for, as Messrs. Rowntree and Co. said in their letter, "any candidate who really understands the matter will, of course, strike out a line of his own, and will not follow too closely any suggestion that you may offer."

We therefore offer, with much pleasure, a prize of £50 for the best essay on :—

The Fermentation and Drying of the Cacao or Cocoa Bean (*Theobroma cacao*).

The essay should record precisely and in full detail the changes resulting from the processes of fermentation and drying that take place in the bean from maturity in the pod to the time of putting the cured beans into bags for market. Biological as well as chemical changes should be noted. The action of maximum, minimum and optimum temperatures, and of checks producing differences of times in the fermentation and drying processes should be noted for every stage. The differences due to such variations on the resultant cured bean should be clearly traced. The possibility should be discussed of producing at will by such variations, and independently of the natural character of the bean, varieties of taste and of colour, both internal and external, so as to simulate the different kinds of cocoa known on the market. Alterations that might be made in ordinary methods so as to improve the quality of the cocoa should be explained. Waste products should be considered, and their potential value indicated.

The experiments on which results are based should deal with the beans in marketable quantities, and samples should be submitted in illustration of statements made.

"TROPICAL LIFE" PRIZE FOR THE BEST ESSAY ON THE FERMENTATION AND DRYING OF COCOA.

COUPON to be filled in and returned, with the essay, to the Editor of TROPICAL LIFE, 112, Fenchurch Street, London, E.C.

I hereby agree to be bound in all respects by the decision of the Editor of TROPICAL LIFE and the conditions printed below. In case of dispute the Editor's decision to be final and binding.

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(4) An English translation must accompany all essays not written in that language, so that the onus and risk as to correct translation will rest with the competitor.

(5) Essays must be written on one side of the paper only ; when possible the essay should be typewritten. In any case the writing must be clear and distinct. Corrections causing doubt or difficulty to decipher must be avoided.

(6) All essays must be sent to the Editor of TROPICAL LIFE, at his City Office, 112, Fenchurch Street, London, E.C., to reach him on or before January 31st, 1911. No essay arriving after that date will be eligible for competition. Every essay will be acknowledged on receipt.

(7) Every essay sent in must have attached to the head of the first page the competitor's full name and postal address. In submitting the essays to the Judges, the name however will not be made known until after the prize is awarded.

(8) After the prize has been awarded any balance left over will be devoted to publishing those essays which, in the opinion of the publishers, are considered of sufficient merit.

(9) Competitors must fill in and attach the above coupon to their essay.

The Tropical and Travel Exhibition.

BOTH the Tropical and Arctic Zones were well represented at the opening of the Tropical and Travel Exhibition on July 6th. Lieutenant Shackleton, just arrived from the South Pole, performed the opening ceremony in a neat little speech, in which he pointed out the extreme value of such an exhibition for those about to set out on long exploring voyages, or journeys across country where the packages must be small, and nutriment, medicine, &c., concentrated to the uttermost minimum. On the other hand, instruments and implements, tents, beds, &c., must often be taken, and it is surprising how unsympathetic many firms, who ought to know better, are to the efforts thus made to introduce and push their specialities among those who buy them freely from the more enterprising firms who exhibit. As we have before pointed out, the Tropics cannot be too prominently represented at such shows, for meat extracts from our Colonies and South America, cocoa and chocolate, rubber appliances, oils, &c., are among the first articles to be seen to. Messrs. Cadbury had, we were glad to see, a most attractive stall, and another year we hope to see many more of the cocoa manufacturers represented. Among the Tropical visitors we noticed Sir Henry and Lady Blake (lately returned from Jamaica), Sir Daniel Morris, Mr. Norman Grieve, Mrs. Brown-Paterson (correspondent of the *Statesman* of Calcutta) and her daughter, Mr. Wickham Jones, of Bull's Wharf, one of the principal rubber-receiving depots, and many others connected with the production or importation of tropical produce.

The Cultivation of Sisal.

(*Agave Rigida.*)

Part VI.

This month we will turn, by special request, as the concert programmes say, to the machinery necessary to clean the fibre, and whilst doing so our readers will, we feel sure, excuse us if we do not confine our remarks entirely to Sisal cleaning machinery. As Mr. McCollough, the Secretary of the Davao Planters' Association, Philippine Islands, very truly says, referring to manilla fibre planting, "With . . . a machine that can turn out from 800 to 1,000 lb. of fibre per day[1] the future of

A Sisal Field in Full Bearing.

manilla hemp-raising presents new and more promising features."

There are, roughly speaking, about a dozen fibre machines, less rather than more, worth even thinking of. Even of these, how many can be relied upon to give continuous satisfaction is very doubtful. As regards Sisal, we know that friends in the West Indies, who have some 4,000 acres or more under cultivation, besides three or four times that area which they hope in time to cover with Sisal, have, after trying several machines, imported a Bœken extractor as being preferable. We have heard many reports—more or less inspired, perhaps—on other well-known machines that caused us to wonder why the company were not better satisfied with them, so we asked the reason, which, summed up in a single sentence, amounted to the fact that, after trying the other machines, they preferred Bœken's, and so, now that they were about to considerably extend their cultivations, they had got out a very large plant—I believe, the largest individual machine yet made—and are going to rely on it in preference to the other makes. We hope to be favoured with the results of the experiments, and to be able later on to show how far their belief in the machine has been justified.

The ever-increasing acreage being put under Sisal is causing more and more demand to arise for suitable and reliable machinery, both for large and small areas, to clean the fibre. There is also no doubt that, once the confidence of the smaller planters—say those with 500 acres and under—in any one machine is established, a much larger number will take up Sisal cultivation in Queensland, the West Indies, the Bahamas, Mauritius, Texas, Yucatan, Hawaii, &c. At present such men are prevented from doing so owing to their not being satisfied with the machines that they have come into contact with, and their lack of knowledge about the one or two machines that seem best able to do the work required of them. To our mind, what should be done is to put up a large central factory (to be fed by tramlines and overhead ropeways), somewhat in the same way as the British Cotton-growing Association has erected large central ginneries in Africa and elsewhere. This would enable the planters around either to sell their leaves outright to the factory at a price based on a sliding scale adjustable to the European and American price of the fibre, or else pay so much per ton of cleaned fibre obtained for having it cleaned. Such a central factory should, of course, be run on co-operative lines, so that the profits can be divided among the planters, and thus avoid unnecessary haggling and disputes as to price for the work to be done. Central factories run by the smaller planters would also, since they cause the cost to fall less heavily on individuals, tend to encourage further attention to improvements in the machines used, and also enable adequate attention to be given to the utilization of bye products, such as working up the waste fibre into cellulose or pulp for paper-making, and utilizing the leaf-refuse and juices for fertilizing the land whence they sprung, either alone or in conjunction with fertilizers made up to specified formulæ.

Conducted on these lines, there is no doubt that the cultivation of Sisal and other Agaves, Fourcroya, &c., would be greatly extended, as the cost of preparation would be reduced to a minimum, and the utmost value obtained not only for the fibre itself, but also for the bye-products of the plants, valuable matter which at present is allowed to go to waste.[2]

We do not yet know how far the Bœken extractor, as at present constructed, is suitable for manilla hemp; it may not be at all suitable, as the machines are specially built to treat the leaves of the Agave, Fourcroya, and Sanseviera families, and it has still to be seen how they can clean the *Musa textilis*. With this fibre-producing plant it is variously estimated that from 20 to 30 per cent. of the fibre is wasted owing to the crude native methods adopted for

A Sisal Field, showing the Light Railway running Through.

[1] Against 15 to 20 lb. per man, as at present.—Ed. *T.L.*

[2] See Dr. Heim and M. Hébert, "Composition et emploi de la pulpe de défibrage de Henequen," Paris, 1909, according to which Sisal, per 1,000 leaves, extracts from the soil: Phosphoric acid, 0·24 kilos.; Lime, 1·14 kilos.; Potash, 0·62 kilos.; Nitrogen, 0·16 kilos.; whilst the dried pulp can return, per 100 kilos. dry weight: Mineral matter, 12·11 kilos.; Phosphoric acid, 0·16 kilos.; Lime, 3·57 kilos.; Potash, 1·22 kilos.; Nitrogen, 3·79 kilos.

extracting it (see Mr. McCollough's article on "Manilla Planting in the Philippines," TROPICAL LIFE for June, p. 86). Several attempts have been made in the past to

SISAL LEAVES ON THE WAGONS, GOING TO THE FACTORY.

perfect machines for extracting the fibre economically, but up to now the natives have not taken to them. The waste fibre, again, if needed for paper making must not be too much injured by the juice and pulp. "If," it is urged by the American paper makers, "waste fibre can be utilized for paper making, it will be nothing more nor less than a godsend to the manufacturers of rope paper in the United States of America, who are altogether dependent upon old rope for paper-making purposes."

The Economic Value of a School of Tropical Medicine.

Having published two articles on the excellent work that the London School of Tropical Medicine is carrying on in the Tropics, we now have much pleasure in enabling our readers to see a group of those who are at present labouring so hard in order to make life possible where it was impossible before, and to make it more certain where hitherto it has not been safe for Europeans to remain.

"Subscriptions are badly needed to enable those connected with the London School of Tropical Medicine to push on with their work. Every resident and visitor in the tropical zone benefits through this most necessary institution, we therefore hope that every reader of TROPICAL LIFE *will send a subscription or donation to enable the work to be further extended. Cheques or money orders can be sent to P. Michelli, Esq., C.M.G., Secretary, London School of Tropical Medicine, 'Dreadnought' Hospital, Greenwich, London, S.E., or, if preferred, to the Editor of* TROPICAL LIFE. *Acknowledgment will be made in this column for all amounts sent, no matter how small, if the sender will mention the name of this paper in his letter covering the remittance."*

THE STAFF AND STUDENTS OF THE LONDON SCHOOL OF TROPICAL MEDICINE, JULY, 1909.

Left to Right: Front Row, Sitting on Ground—T. Chalmers, J. Guillen, M. Kumagawa (Staff Surgeon Japanese Navy), G. F. Forde, J. A. Harley, A. Lundie, J. Braxton Hicks (Senior House Surgeon), J. T. Froyland, J. E. Skinner.

Second Row, Sitting—C. M. Wenyon (Protozoologist), H. B. Newham (Demonstrator), Comdr. G. Hodgkinson, R.N., R. C. Macpherson, Miss I. Wilkinson, Sir Patrick Manson, K.C.M.G. (Lecturer), Prof. Deycke, Sir Francis Lovell, C.M.G. (Dean), G. King (Capt. I.M.S.), S. Lewis, G. A. Turner, R. A. Lloyd (Capt. I.M.S.), C. Strangman, L. Larsen.

Third Row, Standing—C. W. Daniels (Director), Robert (2nd Laboratory Assistant), P. Bahr, J. Gilgud, Esq., C. Bowle-Evans (Major I.M.S.), H. Fowler, H. Bryan, J. F. D'Mello, T. Bayfield, W. E. Giblin, W. H. Peacock, C. S. Ford (Major U.S. Army), J. L. Lunham (Capt. I.M.S.), R. Brooke (Capt. U.S. Army), F. Elwes (Capt. I.M.S.). J. Ottley (late Staff Surgeon, R.N.), G. Warren (Senior Laboratory Assistant).

Back Row—A. C. Douglas, Esq., M. de Miranda, E. Henao, P. J. de Miranda, J. MacWillie, A. Ingram, J. O'Connell, J. G. Vaughan, T.W. Stewart (Lt.-Col. I.M.S.), G. Keigwin, H. Macfarlane, W. Parsons, H. E. Arbuckle, J. Bailey, W. Sieger.

Absent—W. Venis, D. E. Anderson, J. H. McDonald (Major I.M.S.), W. R. Macdonald, Y. Froes, A. King, Col. A. Alcock, I.M.S. (Arthropodologist), R. T. Leiper (Helminthologist), A. Robertson (Junior House Surgeon).

Recent Researches on Rubber—and a Theory.

By HERBERT J. BULT, F.C.S., and STANLEY R. BULT.

SOME recent experimental investigations on the spontaneous changes that occur in rubber have been conducted by D. Spence and K. Bing.

D. Spence has gone somewhat closely into the subject of "tackiness," and has arrived at the conclusion that bacterial activity cannot have more than an indirect action upon rubber itself. The action of micro-organisms on rubber has before now been suggested as the cause of tackiness, but it seems more likely that such action would take place in the impurities in the rubber rather than in the rubber itself. Spence inclines to the opinion that the alteration of the state of the rubber is a physical or chemical change, and his investigations, as well as the subsequent experiments of K. Bing, tend to establish this as a fact. It may therefore be interesting to note the experiments of Spence.

A sample of latex from *Funtumia elastica* was dialyzed in running water for twenty-four hours, pasteurized, by being heated to 80° C. for ten minutes, and filtered. One half was then treated with one-fifth of its volume of a dilute solution of sulphuric acid (decinormal) in a sterilized flask, and to the other half was added one-fifth of its volume of sterile water in a similar flask. The two flasks were kept at a temperature of 35° C., in an incubator, for one month, at the end of which time the latex which had been treated with sulphuric acid was found to be completely coagulated, whilst the portion to which water only had been added had undergone very little change, the globules having clotted together into a sort of cream, which easily broke up when shaken. Alcohol was added to the contents of the flasks, and the resulting rubbers, precipitated on heating, were found to differ widely. The acidified latex yielded a very soft and plastic rubber, with little tensile strength, or nerve, whilst the second was an exceilent sample of rubber.

No oxidation had taken place in the acidified sample, as the weight of rubber obtained from each was the same, and both samples contained about 3 per cent. of oxygen. Solutions of the rubbers differed very widely in viscosity, but the amount of bromides (as determined by Budde's method) and the resin contents were similar. It would therefore seem likely that the alteration is due to a physical change in the coalescence or aggregation of the particles, or of the molecules.

K. Bing has come to the conclusion that loss of insulating properties in india-rubber is to some extent due to the formation of sulphuric acid, since in every one of the samples of deteriorated rubber (billiard strip, reclaimed rubbers, bicycle tyre and inner tube) examined by him, free sulphuric acid was present. In addition to this, a characteristic resinous odour was perceptible in all the deteriorated samples. It was found that the samples containing the greatest amount of sulphuric acid were those with the least mineral matter, provided this contained lead or copper compounds. This discovery led to further experiments in this direction, and three samples of vulcanized rubber were selected as follows:—

(1) Pneumatic inner tubes, containing lead in the ash.
(2) Red "floating" waste.
(3) A Pará rubber mixing of high quality.

A portion of each of these samples was heated for a considerable time in an iron autoclave, with a dilute solution of caustic soda; and another portion was similarly treated in a copper autoclave. The rubber was then treated in various ways, and afterwards exposed to the atmosphere. Deterioration became evident more slowly when the alkali was imperfectly removed, and the samples which had been treated in a copper autoclave showed signs of deterioration much more rapidly than when an iron autoclave was employed. The grey inner tube proved the worst sample, deterioration becoming visible within a few days when the rubber was heated in a copper autoclave, and one month in the case of an iron autoclave, whilst red "floating" waste and Pará rubber mixing remained unchanged for a much longer period.

Furthermore, when a solution of copper chloride was added to the rubbers in the iron autoclave deterioration took place in about the same time as when the heating was effected in the copper autoclave without a copper solution.

This latter statement seems to us to open up a field for discussion. Is the deterioration of rubber caused by electrolytic action between the rubber, or the impurities in the rubber, and the lead or copper?

Our meaning may perhaps be clearer if we attempt the following explanation. When two metals, salts of metals, or other substances possessing different electrolytic activity, come into contact in an electrolyte, electrolytic action is produced.

Copper is more electro-positive than lead, and lead is more so than iron. When, therefore, rubber containing lead comes into contact with copper (either from the copper autoclave or from an added solution of copper, or even from the small amount of copper which would be dissolved by the caustic soda), in a solution favourable to electrolytic action, *e.g.*, dilute caustic soda, is it unreasonable to suppose that a slight electrolytic action *is* produced? Perhaps very slight, but maybe sufficient to alter the state of aggregation of the molecules of the rubber.

But in the case of an iron autoclave the action would be much smaller, as iron possesses the property of electrolytic activity to a lesser degree than copper.

Bing's researches prove that the presence of copper or lead (both being electro-active to a greater degree than iron) is followed by a rapid deterioration of the rubber. The action produced would not be directly on the rubber, since rubber itself, that is, pure caoutchouc, is inert to electrical action; but the impurities, resinous matters, and metallic substances are not inert, and these being distributed throughout the mass the electric current would be brought into intimate contact with the rubber particles, causing the phenomena already noticed.

THE "LOUISIANA PLANTER" TWENTY-ONE YEARS OLD.

WITH their issue of July 3rd the *Louisiana Planter* completed its twenty-first year and came of age. We are quite sure that no other sugar journal in the world has proceeded from infancy to maturity with equal success in inspiring the confidence of its readers. We first made the acquaintance of the *Louisiana Planter* when located in Trinidad, W.I., in November, 1890, and have remained an admirer of it ever since. At that time, on account of the reputation the paper had already obtained, we did not realize that it was then not quite thirty months old. We tender our heartiest congratulation to Dr. Stubbs and his colleagues on their journal's twenty-first birthday.

Manilla Hemp.

FIBRE PRODUCTION AS SEEN IN DAVAO, PHILIPPINE ISLANDS.

By MAX L. MCCOLLOUGH,
Secretary Davao Planters' Association.

(*Continued from p.* 87.)

Planting.—The soil selected for the planting of hemp should be volcanic in its origin, porous, and well drained. Generally the land chosen is covered with a more or less dense forest growth, with practically no weeds or grass growing under the trees. The object is to have the field for the new planting as free from grass and weeds as possible. And so it frequently happens that the felling of a dense jungle proves to be less expensive in the long run than clearing off land which is covered only with "second growth," which almost invariably is foul with grass. When jungle is to be cleared for the planting of hemp the land is first underbrushed, after which the trees are felled and cut up so that the whole tangled mass lays compactly over the field. This is done in order that when set afire it may burn evenly and well. The trees after having been felled are allowed to dry in the hot sun for three or four weeks, and then when wind and weather are favourable the whole mass is set afire. In many cases all the brush and smaller limbs are entirely consumed by the fire, leaving only the trunks of the larger trees lying here and there over the blackened field. In case the "burn" is not a good one, labourers must gather all of the smaller limbs and trunks into piles and burn them. The ground is then ready for planting.

To the uninitiated, such a field looks anything but ready for planting. It is full of charred stumps and giant logs; of prostrate trunks of forest trees, some of them, perhaps, still smoking from the recent fire. The ground is covered with a fine, light cinder, while here and there long streaks of white ashes tell where some monarch of the forest, drier than his fellows or subjected to a greater heat, has been entirely consumed. All stumps are left untouched, the larger logs unmoved, and the field is lined-off and the holes for the hemp seeds dug in rows as straight as practicable. Holes are generally only large enough to accommodate the "seed" or root-bulb, planted so that the upper part is even with the surface of the ground. The stumps and logs interfere somewhat with the planting and other operations, but it has been found unprofitable to attempt to remove or burn them. Almost at once they are attacked, and are rapidly destroyed by the white ants, while the humid atmosphere and the frequent rains are conducive to speedy decay. At the end of six months the smaller stumps are honeycombed by the white ants, and within a year the majority of them can be easily broken down. By the time the abacá plants begin to mature (two years) and "stripping" operations are in order, only the largest stumps and logs remain to hinder in a small way the operations of the harvest. Hemp is planted in rows 10 ft. apart each way, allowing 400 "hills" to the acre, or, in the language of the islands, 1,000 "hills" to the hectare.

Care and Cultivation.—When the young sprouts of the abacá are just breaking through the ground, workmen are sent through the filed with hoes and bolos. All sprouts are cut from any growing stumps and the ground cleaned of any grass, weeds, or young forest growth which may have started. Then between each row of hemp is set out cuttings of the native sweet potatoe, or "camote." These take root quickly, and soon cover the ground with their moist and fragrant leaves; thus by their shade keeping down the growth of noxious weeds and grasses and simplifying in a marked degree the problem of weeding and cleaning the young plantation. These quickly-growing "camotes" oftentimes close in on the young hemp and tend to seriously retard its growth. In such cases the runners of these vines have to be pulled away from the hemp to allow the young plant to get plenty of air and sunlight, two absolutely essential factors for satisfactory growth and development. Hemp is not "cultivated" at all, except in so far as the cutting of grass and weeds with hoes and bolos serves to loosen up the ground around the young plants. All such weeding and cutting, it is needless to say, is done by hand labour, as the condition of the new hemp field precludes the possibility of using animal power or farm machinery. After the hemp plants have grown a year, provided they have been cared for properly, they will have practically covered the ground with their branching crowns, and by their shade will keep down any further growth of grass. From this time until the oldest stalks reach maturity and the harvest begins, very little attention need be given the field: the "camotes" disappearing with the grass as the shade from the larger hemp becomes denser and conditions on the surface of the ground less favourable to vegetable growth.

Harvesting or "Stripping" the Fibre.—After two years have run their course, the planter may prepare for the harvest, which is to continue steadily for from five to ten years thereafter. In some places hemp "stripping," as the cleaning of the fibre is called, begins considerably sooner than two years from the planting of the seed. In the favoured district of Davao the usual time for hemp to reach maturity is eighteen months, and some planters have begun to strip from mature stalks within sixteen and even fourteen months from the date of planting the root-bulb in the fertile virgin soil.

When from the centre of the leaves forming the crown of the plant the flower-bud appears, one knows that it is time to strip. The plant has now attained its full growth, and has begun to put forth the stalk whereon later will come both flower and fruit. As soon as the flower-bud appears, the hemp stalk is cut just above the ground and the leafy crown lopped off, thus leaving the stalk composed of its concentric-like leaf petioles ready for the stripping knife. The apparatus used for stripping or separating the fibre from the fleshy material of the petiole is a crude combination of levers, a small block of hard wood, and a dull knife-blade. It is operated by one man (known as the "hagutero," or stripper), and can easily be taken apart and carried by him from place to place in the hemp plantation. Before the hemp stalk can be passed under the knife of the stripping apparatus it has to be "tuxied," or separated into narrow ribbons. These ribbons are about 2 in. wide, and consist only of the outer surfaces of the leaf petioles—the rest of the petiole with its encased fibre, on account of the larger amount of pulp or non-fibrous material contained, being thrown aside and left to serve as a sort of fertilizer. The dull blade of the stripping apparatus is made of soft iron or sometimes of hard mountain bamboo. It is firmly fastened to the upper side of a wooden lever on the shorter arm and near the fulcrum. On the longer arm of this lever is hung a weight, consisting generally of a rock

about the size of man's head, which can be moved at will along the arm of the lever, thus regulating the pressure of the knife blade upon the small block of hard wood against which it presses, the two surfaces fitting perfectly. By means of a foot-tread, which is attached to the end of the lever holding the knife-blade, the stripper pulls down that end of the lever and separates the knife edge from the block of hard wood above it. The ribbons containing the fibre and its encasing bast material are then one by one placed over the knife, which, by a release of the foot-tread, springs back, holding the ribbon firmly against the block of hard wood above. The stripper then takes a firm grip on the ribbon by turning it around a small stick, which he carries in his hand, and starts it with a quick movement, pulling it between the knife and the wood. He thus cleans completely the fibre from the non-fibrous material which surrounded it. The end of the ribbon which served as a grip at first is reversed and passed over the knife in the same way. In place of the fleshy, discoloured abacá ribbon there is now a small wisp of clean, white fibre, which only needs a few hours of sunshine before it is dried thoroughly and fit for classification, baling, and sale in the distant markets of the world as the well-known "manilla fibre." Hemp-stripping is hard work, and only the strongest of native labourers attempt it. Not infrequently rupture results from the severe strain required, and scarcely any of the strippers work steadily. Generally from two to three days per week, aside from Sunday, are taken for resting-up. This work of stripping may be continued throughout the year, for once a hemp field is producing the fibre can be harvested steadily.

(*To be continued.*)

Rubber Prospects in Peru.

In his paper, illustrated with admirable lantern slides, read before the Society of Arts, Sir Clements Markham, K.C.B., in the chair, Mr. C. Reginald Enock, F.R.G.S., author of "Peru" and "The Andes and the Amazon,"[1] pointed out that Peru is naturally divided into three zones—the coast, the mountains, and the forest regions respectively. The third zone is known as the "Montaña," or region of the forests of the Amazon plain. The natural resources of this vast region might be summed up by saying that it forms one of the world's great natural storehouses for the future. It is traversed by navigable streams and rivers in great part—all affluents of the Amazon. Of these waters 10,000 miles are navigable at all seasons of the year for steamers of varying draught, whilst in the wet season the total available navigable waters in rivers and streams for steamers, launches, and canoes exceed 20,000 miles, all in Peruvian territory.

The main product of this wild region at present is rubber, of which the output is valued at about £1,250,000 sterling per annum. In the Peruvian montaña there are very extensive rubber-bearing forests, both in that part of the Amazon plain drained by the affluents of the Madre de Dios river, and, although less known, the region to the north drained by the Marañon and Huallaga. The principal Peruvian rubber-bearing trees are the Hevea and the Caucho (Castilloa). The Hevea lends itself to cultivation, although not much has been done in Peru yet in rubber-planting. Large areas of rubber-bearing land have been taken up in Peru, principally by Peruvians, but partly by foreign companies, though much land still remains unoccupied.

Being interested in Mr. Enock's description of the rubber belt, the Editor of Tropical Life enquired about the nature of the labour available, and whether any would have to be imported, provided it was decided to cultivate rubber in Peru. It would also be of interest, he urged, if information was forthcoming as to whether the cost of the land would be an important consideration in the question, and whether the transport of the rubber when it was grown would be a serious matter. Would it be possible to bring the produce down to the Pacific coast instead of, as at present, having to make the long journey down the Amazon to the Atlantic seaboard? Unless that was possible it would render the profitable cultivation of rubber in Peru quite hopeless, compared with the Federated Malay States and Ceylon, where the cost of transport was comparatively low. He understood that the rubber grown in Peru was of excellent quality, as it was in Bolivia, but the danger and expense of cultivating it was very great.

Among the others taking part in the discussion was Mr. J. B. Carruthers, who is in London *en route* for the West Indies, who asked the lecturer for information respecting the proportion of Para rubber trees in the natural jungle region he had described as rubber-producing, and what were the possibilities of extracting the rubber from them, apart altogether from the question o planting rubber.

Mr. Enock, in reply, said that labour in the forest regions was rather scarce, and he believed some of the rubber companies engaged there had found that their main difficulty. Peru was anxious to introduce Japanese labour, a good deal of which was employed on the coast. The natural outlet of the rubber region was down the Amazon, because the rubber forests existed on the tributaries of that river. It had, nevertheless, been found cheaper by some of the companies working the rubber lands to bring the rubber over the Andes and down the railway to Mollendo. As soon as roads, perhaps motor roads, and short lines of railways were constructed on the natural outlet down the Amazon, he thought there would be an enormous development of trade. The Amazon forests possessed the peculiarity that they were unlike the other forests of the world, which consisted very largely of one kind of tree. They consisted of all kinds of trees, in fact he believed it had been calculated that in one square mile there existed thousands of different kinds of trees, and this rendered the Amazon forests perhaps of less value than some of the other forests of the world. The question of the proportion of rubber trees to other trees was hard to answer. The rubber-bearing land was confined to a certain zone of land on the margin of the rivers which are tributary to the Amazon; but it was impossible to state the exact proportion it occupied of the total area.

We are glad to see that more systematic attention at most centres is being given to fighting pests on the estates abroad. One firm told us of an order being received for a hundred spraying machines, and others spoke of doing much better in this line, especially for the all-metal machines, which do not get out of order when allowed to stand by a little.

[1] Fisher Unwin, London.

"Tropical Life" Friend.—No. 49.

MR. ROBERT HAWE, B.A.

(Trinity College, Dublin).

A well-known authority on the Training of Boys for a Tropical and Colonial Life.

"OUR FRIEND" this month, who hails from Ireland, is, we believe, the youngest member of the Council of the College of Preceptors; he is also a member of London University. In everyday life he is best known as headmaster of The High School for Boys at Croydon, just beyond the Metropolitan area of London. He has always been a close friend of TROPICAL LIFE, and we have on several occasions made use of his knowledge as to the best course of training the sons of our readers in the Tropics should pursue on this side. No matter whether the boys were to pass through his school or not, Mr. Hawe has always been equally willing to help us in matters which at times become quite perplexing to decide. This has especially been the case with boys from Brazil and South America. At Sao Paulo Mr. Hawe has relations and friends who pay him periodical visits, and with their combined knowledge we have been so far able to answer all queries that have arisen with perfect satisfaction.

"Our Friend," like ourselves, has long recognized that that there is a marked tendency for the intellectual "labour market" on this side to be much overdone. In his school curriculum, therefore, Mr. Hawe arranges for the boys to have a thorough rudimentary training in chemistry, science, botany, analytical work and languages, so that if they wish to take up agriculture or colonial and tropical development as a profession, they can do so without loss of time, by passing straight from his school into the training college or laboratory. In cases where the fathers of the boys own large estates, run on scientific lines, their sons find it sufficient, by taking the more advanced classes at school, to complete their education on the estate itself, and finally obtain their degrees when returning to this side, or in their own universities.

Mr. Hawe received his early training at the well-known Ranelagh School, Athlone, where he held a scholarship during his three years' residence. On leaving Ranelagh he was elected to a Scholarship at Santry School, Dublin, famous for its mathematical teaching under the headmastership of Mr. W. G. McClelland, M.A., Senior Moderator and Gold Medallist of Trinity College, Dublin, and author of McClelland's "Spherical Trigonometry." From there he was appointed to a leading school up North, and later to one in Somersetshire. As becomes his birth Mr. Hawe's Alma Mater is Trinity College, Dublin.

It was soon after 1892 that we first came into contact with "Our Friend." In that year he founded the High School for Boys at Croydon, which after outgrowing several establishments is now situated in a commodious block of buildings specially built and adapted for a school. As we know many of our Spanish readers were trained at St. George's College of the Josephite Order, we would add that Mr. Hawe's school adjoins the grounds of the Roman Catholic Church and is nearly opposite the building formerly occupied by the College.

What the trade of this country needs, as we state at length in our leader on the opposite page, is for each one to do his best to extend our influence abroad as a commercial centre. To do this at least one boy in every three, and better still, every other boy, should go abroad, either as a planter or manager on an estate, or else as clerk in a commercial house, until such time as he can set up for himself. Over here his place, to a considerable extent, can be well filled by female labour, which is in fact already driving him out from offices on this side, and the sooner that both fathers and sons recognize the fact, and the boys are sent to schools which specially train them for a colonial and tropical life, the better for the boys themselves and the country at large. As Mr. Hawe specializes in this, we have much pleasure in including him among the Gallery of Friends of TROPICAL LIFE.

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How "Tropical Life" Creates Trade.

AN UNSOLICITED TESTIMONIAL.

A PANAMA rubber-planter writes: "TROPICAL LIFE arrives regularly, and I have made the fullest use of it. The articles on Castilloa rubber have been of particular interest to me, and I have made frequent use of your advertisements. So far, through the medium of TROPICAL LIFE I have placed orders for a large Passburg plant which will soon be in working order, and also for a complete rubber-washing plant with boilers and engines, from Messrs. Francis Shaw & Co., Manchester.

"I now have to enlist your assistance for putting me into touch with the makers of machinery for making tapioca starch from cassava, as I may be wanting quite a large plant. Your article on the Bullivant's Cableway interests us, as one of the estates here is exceedingly hilly, and such a transport method would seem to be the only way out of the difficulty as far as the developing of this estate is concerned."

Business Notices.

1.—The address of TROPICAL LIFE is Messrs. BALE, SONS AND DANIELSSON, Ltd., 83-91, Great Titchfield Street, London, W.

2.—All **literary communications** should be addressed **to the Editor,** and accompanied by the necessary stamps for their return if not accepted.

3.—All **business communications and payments**, either for subscriptions or advertisements, should be sent **to the Publishers** of TROPICAL LIFE. Cheques to be crossed The Union Bank of London, Ltd.

4.—The Subscription, which is **Ten Shillings** per annum, may commence at any time, and is payable in advance.

5.—The Advertisement Department is at 112, Fenchurch Street, E.C., where all enquiries respecting advertisements, charges, &c., should be addressed to the Manager of the Department.

6.—Changes of address should be promptly notified.

7.—Non-receipt of copies of the Journal should be notified to the Publishers.

8.—The Journal will be issued on or about the twentieth of the month.

Tropical Life.

JULY, 1909.

Labour at Home and in the Tropics.

THERE is a common, in fact a general, idea--for the exceptions are few and far between—that it is derogatory, and, in fact, inconceivable that white folks should go to the Tropics and work as estate labourers or small peasant proprietors, like "niggers" and "coloured people." The excuse given is, more often than not, that the climate would render this impossible, and that if the parents themselves did not quickly die their children would, or at the best grow up pale-faced, emaciated wastlings, an advantage and a credit to no one. On account of this, therefore, huge areas of land lay undeveloped and unproductive where Europeans could settle and work—work like "niggers"—and be all the better for it; far better than to remain at home, if they persevere, for the good of themselves, their children, and the Empire at large. Perchance the parents may get knocked up, and even die, but we shall show that at times life at home deals no more kindly with them. In course of time, however, when the second and third generations come along, it would be found that a large proportion have become acclimatized, and are very much better off, as a body, than if they had remained at home. Statistics, it is said, prove everything. By them social reformers claim that the status of living in England has been raised enormously, and the wealth of the country increased. This is undoubtedly true, but statistics also show that a very large and very valuable national asset in the shape of at least a million adults and children, are not only allowed to run to waste, but remain in the midst of their more fortunate brothers and sisters a diseased and festering sore, slowly but surely spreading about and around the human social body, wherever and whatever they come into contact with —Poor Law officers, or their relations and friends. The Minority Report of the Royal Commission on the Poor Laws and the Relief of Distress in the United Kingdom proves this beyond a doubt. This Minority Report costs, in London, 1s. 9d. only, and is well worth studying by employers of labour in the Tropics, especially cotton-growers, coffee-planters, &c., needing a large quantity of light labour; for though we fear the day is long distant when the starving poor in England will find work and food, and, above all a pleasant, healthy, out-of-door life among trees and vegetation the most beautiful in the world, that need not prevent the more far-seeing ones from thinking it over and seeing if they cannot make a start in helping to relieve the appalling misery and lack of employment at home.

When with the early settlers in America the struggle for existence became so acute that life was only possible by each man and woman doing their very utmost to secure a living, Captain John Smith it was, we believe, who stood guard over the community and threatened to shoot, or, worse still, to turn adrift among the Indians, any idler among them. This is the class of autocrat that is needed in many places to-day; the pity is he is not there, or, if so, the law cannot allow him to act in such a capacity. If the Empire is to hold together, much less to further develop and reign supreme against all comers, it behoves every one of us, both at home and abroad, to see that he does his utmost to help to increase the average wealth and necessary comfort of the country at large. Those who are not doing so are just as great traitors as the soldiers who refuse to fight when they are needed. Fortunately there is no need to be always fighting, at any rate with powder and shot; but there is an absolute necessity for the members of this Empire to be always fighting—and fiercely fighting—to keep up and maintain the mother-country and her children as they should be. As soldiers cannot fight well without being trained, neither can civilians work steadily without being steadily in work. The children, instead of being herded with undesirables in the workhouses, should be reared in agricultural districts, amid surroundings conducive to a steady agricultural career, and so learn to become agriculturists rather than townsmen. If work cannot be found for them in England, the rest of the Empire, with lands to develop, must be placed at their disposal, where they can obtain employment, first under others, and later for their own account, possibly on co-operative lines; and it must be seen, in the absence of any other remedy, that the children on this side are trained up and taught agricultural and other country pursuits, causing their love for the country rather than town to be developed, as by doing so we fit them to become settlers in the Colonies and elsewhere, and so help to increase the demand for manufactured goods from this side in exchange for the raw material that they will produce and ship over to us. Queensland could grow thousands of bales of cotton by means of such labour alone, and if those sent out are steady and pushing, they could, after a time, cultivate their own piece of land instead of working for others. The higher lands in British Guiana are untouched; opened out, they would, from all accounts, be as healthy for Europeans as the higher veldts in Africa. The profit may not, at first, be large, or even adequate, but it would be far better in all ways than living in squalor over here, and would in the aggregate swell the trade of the Empire to a considerable extent—an increase that would be greatly welcome just now.

At present we are told that £4,000,000 a year is spent—one might almost say mis-spent—on outdoor relief alone. "A large part of this sum," says the Minority Report (p. 692) already referred to, "is a subsidy to insanitary, to disorderly, or even to vicious habits of life. The saddest feature of all is that no small proportion of the 240,000 children whom, in the United Kingdom, the Destitution Authority elects to bring up

upon outdoor relief—in the course of a year, probably as many as 600,000 different children—are to-day chronically underfed, insufficiently clothed, badly housed, and in literally thousands of cases actually being brought up at the public expense, in drunken and dissolute homes"—homes some of which are "in (p. 41) a state of indescribable filth and neglect, the abodes of habitual intemperance, and disorderly living," where "overcrowding is of such a kind that ordinary decency is impossible"—and "many of the houses stood forsaken, with broken windows and doors, dirty, forlorn, and tumbling to pieces."

With such a state of affairs as this in a civilized country, are we wrong in suggesting that the surplus population goes, or is sent (of course at their option to remaining here to starve) to the Tropics, and sub-tropical countries to supply badly-needed labour, and to live a life that must be brighter and healthier, or, at any rate, that cannot be worse than is, in many cases, the one at home, whilst the future prospects for the steady worker are decidedly more hopeful.

If the life is not congenial, or the labourer unsatisfactory, he must be brought home. The cost of doing so can easily be arranged between the Colony and the Home Government. When we have labour colonies established on this side, the healthy, able-bodied won't-works can choose between them and the colonies, for once a man or woman is sent back in disgrace he or she will never return, if able-bodied, but be sent to a labour-colony. Hence they must choose between working diligently of their own free will abroad, or having to do so by force over here. Even if this class of labour is at first confined within prescribed limits (the women and children for their own sakes), call it if you like by the proper name, "compound" (until the Colony recognizes them as steady workers, and is willing to let them live elsewhere, or they themselves feel safe in going), could that be more distasteful than some of the larger, and from all accounts, many of the smaller workhouses on this side, where paupers of both sexes (p. 7) and all descriptions, aged and impotent, mothers of bastards, and prostitutes, blind people and idiots, and the sick are often immured, where pregnant women are compelled to associate day and night with half-witted imbeciles and women so physically deformed as to be positively repulsive to look upon? (p. 11). Nothing could exceed the degradation and demoralizing effect of putting healthy, able-bodied adults and children with such associates; far better give them a chance to work where they are wanted, where, if they sicken and die, they will do so to a much smaller extent than they do over here, and at least under pleasanter surroundings, but where—if, as the majority will, they survive, and learn to work and to prosper in body and mind—they will prove as great a blessing to themselves and to others as they now seem to be a nuisance.

Since writing the above we see by the London *Evening News* that Mr. Sylvester Browne, a well-known New South Wales pastoralist, and his brother, the novelist "Rolf Boldrewood" (author of "Robbery Under Arms"), have addressed the most important newspapers in Australia on the subject of handing over the Northern Territory to the direct control of Great Britain for a period of years, so that the Imperial Government may systematically settle the territory with deserving unemployed.

The suggestion has created much interest. It is recognized by sections of the Australian public that the development of the huge area of the Northern Territory (which covers an area of 523,620 square miles) will strain the Commonwealth's financial resources, and if thousands of British men and women with none of coloured races could be settled there, Australia, it is claimed, would be immensely served. The country is tropical, but is on the whole well watered and gives promise of success in the cultivation of sugar-cane, coffee, rice, indigo, maize and rubber. It is also adapted to cattle and horse breeding.

Hygiene in Cacao Planting.

One hears a good deal just now of the fungus diseases and insect pests of cacao, and there is no doubt that considerable losses have been sustained thereby. From many important centres, such as Trinidad, Surinam, Ceylon, and St. Thomé, comes the same tale, in varying degrees, and quite recently we hear from the Gold Coast that the yield has been most adversely affected by serious diseases and pests.

Scientific men have been devoting much time and study to these subjects, and whilst, as a consequence of their investigations, many remedial measures have been adopted, one cannot help thinking that the losses sustained might have been at least minimized had more attention been paid to the old proverb, "Prevention is better than cure."

It must not be supposed for one moment that we suggest less attention being paid to the cure—rather would we see it indefinitely extended, since diseases and pests seem to be on the increase—but what seems to us to be essential is that some comparatively simple methods of prevention should be adopted, by which the serious losses now being sustained may be considerably reduced, even if they cannot be altogether avoided.

It is to be feared that such initial precautions have been frequently overlooked in the past. It is certain that all trees and plants are liable to be attacked by disease and pests, and it is equally certain that the strong, healthy plant will more easily withstand the attack than the weakly, neglected one. It is impossible for this strength and vigour to be produced and retained unless great care and attention is devoted to the cultivation and management of the soil and to the proper feeding of the plant.

Is it not a fact that these ordinary precautions are too often neglected? And yet light and air and a proper system of feeding are just as essential to healthy young plant life as they are to children.

First of all, then, cultivate the soil, and see that it does not become packed, and so unable to absorb the rain water and vegetable matter on the top of the soil. However good and rich a soil may be, it must be properly cultivated—nothing is of greater importance than this keeping of the soil porous; all your science and all your systematic feeding will be of no avail if this essential condition is neglected, not only in cacao plantations but all the world over.

Even this comparatively simple operation requires care, and haphazard stirring of the soil without due regard to the roots of the trees may easily do more harm than good. Common-sense and careful supervision are all that are needed in this instance, and that being given, science will assist in providing the next important element, viz., the feeding or manuring of the plant. The Island of

Grenada is noted for the careful cultivation of her cacao trees and the large yields obtained. Dr. Francis Watts, who succeeded Sir Daniel Morris a little time back as Imperial Commissioner of Agriculture for the West Indies, points out in the departmental handbook on Cacao Pests that "it has frequently been noted in Grenada that where a high standard of cultivation is maintained attacks of thrips and other insects are much less frequent, and little serious harm is occasioned." No greater incentive than this to care for and supply the trees with adequate plant-food could possibly be advanced.

Too many planters are apt to imagine that, given a rich soil, a cacao plant or tree will thrive for a long period practically without care and without manure; in fact, that once planted it will take care of itself. It may, of course, happen that in some cases there is a sufficient natural supply of plant-food in the soil to nourish the plants, but such cases are rare; and in *every* case where crops are removed, those crops take with them certain elements which must be replaced, whether it be nitrogen, phosphates, potash, lime, or other plant-food. It is to be presumed that the aim of every planter is to produce a vigorous and healthy tree, which will not only be capable of yielding good crops, but strong enough to resist stoutly the attacks of diseases and pests. He must then, in addition to careful cultivation, see that there is present in the soil a sufficient quantity of the four main plant-foods enumerated above. In these days it is easy to supply these singly or together, as may be required; at the same time it is always advisable to use *some* farmyard manure if possible, for this is valuable not only for its manurial properties but for its mechanical action on the soil. Make a judicious use, then, of artificial manures, according to the requirements of the soil, in conjunction with half the quantity of farmyard manure which would have been applied had it been used exclusively.

Eminent authorities have laid it down that it should be the aim of the cultivator to grow and maintain on his trees as large a proportion of healthy leaves as they can carry, because it is in these that all the material necessary for the purposes of growth and reproduction is formed and distributed.

That being so, the first question which suggests itself is, what particular kind of plant-food will best encourage plants to make leaf? And it will be found that the nitrogenous manures have this effect. They encourage the plants to make leaf, stem, and root, and they prolong the growth of leaf and stem, making the plant grow to a large size. After fruit is set they may then again be used to increase its size.

Such manure should therefore be of immense value during the first few years of a cacao plantation, more especially when it is desired to prevent the tree bearing too early, thus giving it greater strength and productive power later on.

The quickest acting of these nitrogenous manures is nitrate of soda. It should be applied in small quantities two or three times a year during the period of the most active growth, and it will be absorbed by the plant within three or four days. Little and often is a good maxim to remember in this case, three moderate applications being far more efficacious than one large dose.

It must not be imagined, however, that one constituent, such as nitrogen, will produce good results unless the soil is sufficiently supplied with the three other main plant-foods—viz., phosphates, potash, and lime. Phosphates encourage the fruit and act with nitrogen in creating sturdy plants and checking too rank a growth. Potash assists both in the early stages, and later when the fruit is setting; while lime not only helps the growth but improves the tilth of the soil, and causes the other constituents to be more readily taken up by the plants.

Another fruitful source of disease is lack of care in pruning. On this point we cannot do better than quote the words of Hinchley Hart, in his well-known book, "Cacao." It is there stated that the following are good maxims for the cultivator: "Prune little, but prune often. Prune carefully, but prune with decision. Prune for a large amount of healthy leaf surface, and a crop will come."

There are, of course, very many other points of great interest which might be touched on in connection with this subject, but our present object is merely to call attention to the necessity of doing all that can be done to *prevent* disease; and since it cannot be doubted that the stronger the plant or tree is the more capable it will be of resisting the ravages of both disease and pest, we can only urge the importance of producing such strength by thorough cultivation, judicious manuring, and careful and scientific pruning.

The East Indian Immigration.

OUR leader of last month on the above subject caused us to be widely criticized, both by letter and in the columns of our contemporaries. Mr. Prudhomme David, who is recognized as one of the strongest advocates against immigration, finds we are "sitting on the fence" in the matter; but this we cannot allow: we consider that we are most emphatic in our statements. "If," we stated, "the East Indians have a real friend in their Protector of Immigrants . . . . the system, on the whole, does good." The *West India Committee Circular* noticed this sentence and reprinted it. What we might have done in the original article would have been to put the "if" in italics, or double-sized capitals, for everything, in this case, depends on that word "if." It may still upset one of the leading immigration officials, who caused us to look upon the system with disfavour in the past.

We regret to see the style adopted, in the *West India Committee Circular* and in the tropical press, by correspondents in favour of continuing the system. No doubt Messrs. Summerbell, Prudhomme David, Alfred Richards and others, who are opposed to immigration, find no favour in their eyes; but still that is no excuse for raising objections in a manner that betokens a long apprenticeship in the local tropical press, where spiteful, narrow-minded letters are far too common. Such letters only harm both the writer and the journal, and do not benefit the cause they favour.

REPORTS from our Japanese friends point to increasingly unsatisfactory results from the tea plantations in those islands. As many of our tea friends know, we have been carrying on propaganda work there for some time now, by working with those who have been conducting experiments and distributing literature. The consumption of potash salts does not seem to be on as liberal a scale as is necessary. This is accounted for, to a great extent, by the fact that there is a want of ready money among the cultivators at the moment. Until the present depression therefore passes away, no improvement can, we are afraid, be looked for.

Two New Books on Sugar.

CANE SUGAR AND ITS MANUFACTURE. By H. C. Prinsen Geerligs, late Director of the West Java Sugar Experiment Station. 350 pp., with xvi. pp. of Index. Norman Rodger, Altrincham, Manchester, England. Price 12s. nett, or 13s. post free.

As foreshadowed in our issue of May, 1908, Mr. Prinsen Geerligs has published under the above title an English edition of his recent Dutch work, "De Fabricatie van Suiker uit Suikerriet op Java," which forms Part III. of the well-known "Handboek ten Dienste van de Suikerriet-Cultuur en de Rietsuiker Fabricage op Java," issued by the Java Sugar Experiment Station. This is an amplification of his earlier work, "On Cane Sugar and the Process of its Manufacture in Java," pubpublished in 1903, but brought up to date. It extends to 350 pp., of which four-fifths are entirely new matter. Mr. Norman Rodger, in issuing the book, has done even "P. G." justice by the style in which the book has been got up. The binding is neat but strong, and the printing and the tables of figures everything that can be desired in the way of clearness.

The author has certainly succeeded in his object to combine in one book everything that is known about the chemistry and the technology of the sugar cane, and cane sugar manufacture. As a highly scientific work from a chemical point of view, nothing has been omitted. Technical matters relating to machinery, as the author explains in his preface, are not included; for these the reader is referred to Noel Deerr's "Sugar and the Sugar Cane." Only those points in connection with this part of the process are mentioned which are indispensable for the proper understanding of the chemical and technical questions investigated.

The book is divided in two parts, the first, running into 94 pp., dealing with the constituents of the sugar cane, as sucrose, glucose (dextrose), fructose (levulose), &c., together with their proportion and distribution. The second, and much larger part, covering 250 pp., deals with the manufacture in five chapters, *i.e.*, the extraction, clarification, concentration, curing, exhausted molassss.

The various means that can be employed to dispose of the surplus molasses are fully dealt with, and are worthy of the attention of many who otherwise have nothing to do with sugar, for the same as Hughes discovered their great use in connection with fine bagasse as a cattle food, so we feel sure other important uses can be found with which to utilize what is, in many instances, an expense and a nuisance, and prevent such advice being necessary as "the only way of getting rid of this troublesome product is to throw it into the nearest stream." To do so is to spoil the stream, and to waste a possibly valuable manure, or cattle food.

We notice that the book carries no advertisements or advertising matter in any shape or form.

For the sugar laboratory and the chemist, the book apparently contains everything worth knowing that has yet been discovered on the chemistry and technology of the sugar cane and the manufacture of its juice into sugar.

THE Java tea market closes strong. The best averages made were: Goalpara, 10¼d.; Panembangan, 8¾d. The average of the entire sale was 7½d., as against 6½d. last year.

SUGAR. A Handbook for Planters and Refiners, being a Comprehensive Treatise on the Culture of Sugar-yielding Plants, and the Manufacture, Refining, and Analysis of Cane, Beet, Palm, Maple, Melon, Sorghum, and Starch Sugars, with copious statistics of their production and commerce, and a chapter on the Distillation of Rum. With a large number of full-page plates and other figures and illustrations. 876 pp., including 20 pp. of Index. By the late John A. R. Newlands, revised and brought up-to-date by Benj. E. R. Newlands, F.I.C., F.C.S. London: E. and F. N. Spon, Limited, 57, Haymarket, W. New York: Spon and Chamberlain, 123, Liberty Street. Price 25s. net.

IN a footnote attached to our May issue on "The Application of Nitrogen to the Sugar Cane" we called attention to this most useful book, as at the time we were unable, owing to lack of space, to review it. It is a book that should be and will be welcomed at any centre where sugar is produced, whether from cane, beet, sorghum, palm, &c., as each kind has a space devoted to it, and a description of the apparatus or machinery necessary to manufacture the sugar at the various centres in as economical a manner as possible compatible with local conditions.

In face of the efforts now being devoted, we are glad to see, to introducing better methods of cultivation and manufacture of sugar in India, where—as we have already shown,[1] the output of sugar could be at least doubled, were proper machinery in use—we hope that this book will find its way to many an agricultural college and society, to be read and studied by the rising generation, and its advice followed by those already cultivating the land. To make the book as reliable and complete as possible, the advice and assistance of leading authorities were sought, resulting in Mr. Newlands having brought together what can be best described as a perfect mine of information on the subject of sugar, especially as regards its manufacture. A list of the leading authorities consulted by the authors in building up the book alone runs into 12 pp., and includes all the leading books that have been published on sugar since Bell's "Culture of the Sugar Cane" (1831), up to several of last year's (1908) books and sugar journals.

Every sugar-producer, therefore, unless he wants to remain as antiquated in his ideas as the Indian goor-maker, should secure this book, which, if running into some 900 pp., has the information under each section carefully arranged and condensed to the uttermost, and in such a way as to form a useful encyclopædia for reference.

WITH China tea the first arrival of new season's Kintucks were placed on the market on the 6th inst. Only about 3,000 half-chests were offered, several parcels having been sold to arrive, on muster samples. The prices asked were higher than at the same period last year, the teas being stronger and fuller in cup. Little business seems to have taken place so far in the medium grades, but some of the finest chops have been sold at prices ranging from 1s. 8d. to 2s. 1d.

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[1] See TROPICAL LIFE, November, 1906, March, 1907, August, 1907.

Cotton.

THE following were the prices for Cotton in London on July 8th, according to Messrs. Slann and Davies:—

	Good Fair.	Good.	Fine.	Superfine.	Good 1908.	Good 1907.	Compare
	d. d.	d. d.	d. d.	d.	d. d.	d. d.	
Surat kinds * ...	5 to $5\frac{9}{32}$	$5\frac{1}{4}$ to $5\frac{3}{4}$	$5\frac{1}{2}$ to $6\frac{1}{16}$	—	$4\frac{3}{4}$ to $5\frac{1}{4}$	$4\frac{13}{16}$ to $5\frac{15}{16}$	per lb.
Madras	$5\frac{7}{16}$ to $5\frac{9}{16}$	$5\frac{1}{16}$ to $5\frac{13}{16}$	—	—	$3\frac{15}{16}$ to $5\frac{3}{16}$	$4\frac{7}{8}$ to $5\frac{3}{4}$	—
Bengal	—	$4\frac{13}{16}$	$5\frac{1}{16}$	$5\frac{3}{16}$	$3\frac{13}{16}$	$3\frac{15}{16}$	—
Assam	—	$5\frac{1}{4}$	$6\frac{3}{4}$	$7\frac{1}{2}$	$4\frac{1}{4}$	$5\frac{1}{4}$	—
China	—	5	$5\frac{1}{2}$	$5\frac{3}{4}$	$4\frac{3}{8}$	$5\frac{1}{8}$	—
West Indian ...	$5\frac{5}{8}$	$6\frac{1}{8}$	$6\frac{5}{8}$	$6\frac{7}{8}$	$6\frac{1}{4}$	$8\frac{1}{4}$	—
Sea Island ...	7	$9\frac{1}{4}$	$13\frac{1}{2}$	16	10	14	—
Australia	$6\frac{5}{8}$	7	—	—	$6\frac{3}{4}$	$7\frac{3}{4}$	—

* Liverpool quotations.

The Washington Agricultural Bureau issued its Report on the 2nd, and gave the average condition of the crop as 74·6, against 81·2 last month, and 81·1 last year, and total acreage planted 31,918,000, against 33,370,000 last year. This was evidently much worse than was expected, and the market immediately rose 25 points, closing for the week at a total rise of 32 to 36 points. Spot is 31 points dearer at 6·59d. Manchester complains that buyers do not follow the advance, and trading is increasingly difficult. Most East Indian quotations are higher, and but little business has been possible.

The import into Liverpool this week, ending July 10th, amounts to 32,982 bales; since September 1st, 4,153,309, same week last year 28,876, last year's total 3,525,882 bales. The estimated Sales amount to 27,000 bales. Middling American is quoted at 6·59d. per lb.; last year, 6·26d.; 1907, 7·15d.

The latest quotations of Americans for delivery, basis middling, any port, G.O.C., were:—

	July 10th.	Last Week.	Last Year.
	d.	d.	d.
July	$6{\cdot}54\frac{1}{2}$	6·18	$5{\cdot}69\frac{1}{2}$
July—Aug.	$6{\cdot}54\frac{1}{2}$	6·18	$5{\cdot}63\frac{1}{2}$
Aug.—Sept.	$6{\cdot}48\frac{1}{2}$	6·15	$5{\cdot}28\frac{1}{2}$

Movement of American Cotton since September 1st:—

	1908-9.	1907-8.	1906-7.
Brought into sight	13,270,000	11,072,000	13,192,000
Exports from United States since September 1st—			
To Great Britain	3,442,000	2,840,000	3,732,000
To Continent, &c.	4,479,000	4,127,000	4,269,000
Total crop	—	11,571,966	13,510,982

Coffee.

By Messrs. C. M. AND C. WOODHOUSE.

THE tone of the market was rather quiet during the week ending July 10th, but prices show no alteration. Sales for the week amount to 5,700 bags, of which nearly two-thirds consisted of Costa Rica; fine colory kinds sold well and other descriptions maintained previous rates. According to Messrs. Düüring and Zoon's report the stocks in the principal ports of Europe on July 1st were 7,937,000 bags against 9,243,000 bags and 8,010,000 bags in 1908 and 1907 respectively, being a decrease for the month of 328,000 bags against a decrease of 218,000 bags at the same time last year. The visible supplies show an increase of 20,000 bags for the month against a decrease of 452,000 bags last year, the totals being 12,835,000 bags in 1909, 14,139,000 bags in 1908, and 16,307,000 bags in 1907. "Futures" have been quiet but firm, with only a moderate business doing, but in sympathy with higher New York and Continental advices prices at the close show an advance of 9d. per cwt. from last week's rates. We quote:—

		1909. To-day.	July 1st.
London ..	Santos, Sept. delivery.	30s. 9d.	30s.
New York ..	No. 7 Rio ,,	5·70 cents	5·50 cents.
Hamburg ..	Santos ,,	$31\frac{3}{4}$ pf.	$30\frac{3}{4}$ pf.
Havre ..	Santos ,,	$41\frac{3}{4}$ francs	40 francs.

The receipts at Rio and Santos from July 1st to July 7th, 1909, were 289,000 bags, against 158,000 bags and 211,000 bags in the two previous seasons respectively.

Sales include the following, viz.:—

Naidoobatum.—51s. for smalls, 57s. 6d. for good middling, 70s. for bold.

Ceylon cleaned.—50s. for smalls.

Jamaica.—At 40s. 6d. for good ordinary palish.

Costa Rica.—At 45s. to 58s. for ordinary to good smalls, 47s. to 62s. 6d. for fine ordinary to middling, 65s. to 68s. 6d. for good middling, 66s. to 79s. for good middling to fine bold.

Guatemala.—At 45s. 6d. to 49s. 6d. for smalls, 38s. to 42s. for ordinary to good ordinary, 47s. to 53s. for fine fine ordinary to good middling, 54s. 6d. to 56s. 6d. for middling to good middling bold.

Nicaragua.—At 40s. to 45s. for smalls, 43s. to 45s. for fine to fine fine ordinary, 50s. 6d. to 57s. for middling to good middling, 60s. to 73s. for good middling to fine bold.

Salvador.—At 52s. for good middling greyish.

Vera Paz, &c.—At 45s. to 49s. 6d. for smalls, 51s. to 58s. for low middling to middling, 61s. 6d. to 71s. for middling to good middling bold, 91s. 6d. for Maragogipe.

La Guayra.—At 52s. for good middling.

Colombian, &c.—At 38s. to 44s. 6d. for smalls, 49s. 6d. to 56s. for low middling to good middling, 54s. to 68s. 6d. for middling to fine bold.

Rubber Shares.

THE market for Malay and Ceylon Rubber Shares was very quiet during the week ending July 10th. There has been no pressure to sell, but the want of business has made shares in several instances inclined to sag. A large number of small companies being put on the market has inclined to detract public attention from the older companies.

Comparative prices with last month rule as follows (from Messrs. Russell, Grant & Co.'s list) :—

	June 10th		July 8th
Bukit Rajah	$7\frac{7}{8}$	..	$8\frac{1}{8}$ to $8\frac{1}{4}$
Cicely Estates Co.	—	..	$9\frac{1}{2}$ to $9\frac{3}{4}$
Highlands and Lowlands ..	34/- p.	..	36/- to 37/- p.
Klanang Produce Co. ..	5	..	$4\frac{7}{8}$ to 5
Lanadron Estates	25/8	..	$2\frac{1}{8}$ to $2\frac{1}{4}$ p.
Linggi Plantations ..	22/-	..	22/6 to 23/-
Perak Rubber Co.	35/- and over	..	38/6 to 39/6
Selangor Rubber Co. ..	28/-	..	30/- to 31/-
Shelford Rubber Co. ..	24/-	..	23/6 to 24/6
United Serdang Rubber Co.	50/-	..	50/- to 52/6
Vallambrosa Rubber Co. ..	22/6	..	22/6 to 23/-

p. = premium.

Tea.

By Messrs. WM. JAS. AND HY. THOMPSON.

WITH stocks gradually depleting and only the moderate offerings usual at this time of the year, the market to-day (July 8th) may be quoted firm all round, with improved prices for medium, good medium and leaf teas. Brokens show but little improvement, though for these teas there is a strong undercurrent of demand.

The tone of the market for Indian teas has been firm all round, and where a change can be noted it is in favour of sellers. The amount of new crop is, of course, too small at present to really test the buying powers of the trade; suffice it to say that the quality is up to the usual standard, the teas are freely bid for, and the prices made for Darjeelings are decidedly over those of last season.

The best averages obtained for new season's teas were: Darjeeling—Amboottia, 11d.; Soom, $10\frac{3}{4}$d. Assam—Bargang, $8\frac{3}{4}$d.; Moabund Co.'s Sangsua, $8\frac{3}{4}$d. Dooars—Indong, $8\frac{1}{4}$d.; Killcott, 8d. Nilgiri—Kodanaad, $9\frac{1}{4}$d. The average price for the entire sale was $7\frac{3}{4}$d., the figure a year ago being $7\frac{1}{4}$d.

The feature of the Ceylon sales was the continued strong support given to low-priced leaf trees, which was so noticeable the previous week. Pekoes and Pekoe Souchongs, between 6d. and 7d. in most instances, marked a further rise of $\frac{1}{4}$d. per lb.; brokens ranging from 7d. to 8d. remain steady, without any quotable change in values, and the same remark applies to teas up to 9d. per lb. Above that figure there was scarcely as much competition, and several of the better-class brokens sold in buyers' favour. Leafy fannings were wanted, and are dearer; dusts, however, are unchanged. Considering the large supplies coming forward, the quality of the commoner descriptions remains fairly satisfactory.

The following averages were among the best obtained: Sutton, $10\frac{3}{4}$d.; Henfold, $10\frac{1}{4}$d.; Calsay, Clydesdale, and Mount Vernon, $9\frac{1}{2}$d. The average for the whole sale was $7\frac{7}{8}$d., against $7\frac{3}{8}$d. last year.

The India-rubber Market.

By Messrs. S. FIGGIS AND CO.

Market still rising; Fine hard up to 6s. 6d., Plantation up to 7s. $2\frac{1}{4}$d.

SINCE your last appearance prices have steadily tended up. By June 18th fine Bolivian was up to 6s. 2d., and Castilloa, spot, at 3s. $11\frac{3}{4}$d., August delivery 4s. 1d., and the sales on June 25th further advanced prices to 7s. for Vallambrosa smoked sheets, and 6s. 7d. for fair; fine hard selling at 6s. 3d.; Castilloa, August—September, up to 4s. $2\frac{1}{2}$d. At these auctions Plantation sold as follows :—

Malay.—Sheet, smoked part ribbed, 6s. $10\frac{1}{4}$d. to 6s. $11\frac{1}{4}$d.; fair to fine, 6s. 6d. to 6s. $6\frac{3}{4}$d.; mixed inferior, 6s. $1\frac{1}{2}$d. to 6s. $4\frac{1}{2}$d. Crêpe, good to fine pale, 6s. $6\frac{1}{4}$d. to 6s. $9\frac{1}{4}$d.; fair to good palish, 6s. 4d. to 6s. $5\frac{1}{4}$d.; light brown and grey, 6s. 2d. to 6s. $3\frac{3}{4}$d.; clean brown, part dark, 5s. 9d. to 6s. $1\frac{1}{2}$d.; dark brown, part specky, 5s. 4d. to 5s. 7d.; black and soft, 4s. $7\frac{1}{4}$d. to 5s. $3\frac{1}{4}$d. Scrap and lumps, fair to fine, 5s. $2\frac{1}{2}$d. to 5s. $4\frac{3}{4}$d.; dark, 4s. 10d.

Ceylon.—Biscuits and sheets, fair to fine, 6s. $5\frac{3}{4}$d. to 6s. $6\frac{1}{2}$d. Crêpe, clean brown, 6s. $1\frac{1}{2}$d. to 6s. 2d.; black soft, 5s. 2d. Scrap, fair to fine, 5s. $2\frac{1}{2}$d. to 5s. $3\frac{1}{2}$d.

By July 2nd fine hard was up to 6s. 4d., and Castilloa sold at 4s. for spot and 4s. 3d. October—November delivery, and in Antwerp about 525 tons, mostly Congo descriptions, sold at 3d. to $3\frac{1}{2}$d. lb. dearer.

By July 9th the market had advanced another 2d. per lb. for fine Pará, and sales included :—

Hard Fine.—Near delivery up to 6s. 6d.

Soft Fine.—Value of near about 6s. 3d.

Castilloa, Negroheads.—Scrappy Manaos, value about 4s. 6d. Cametas quiet, small sales at 3s. $6\frac{1}{4}$d. Island. Flat. Sellers, 3s. $0\frac{1}{2}$d.

Castilloa Ball.—Dearer. Large sales of spot up to 4s. $1\frac{1}{2}$d. August—September, delivery at 4s. $2\frac{1}{4}$d. to 4s. $2\frac{1}{2}$d. September—October, up to 4s. 3d.

At auctions on the 9th very high prices for Plantation were paid, Sheets being 4d. to 5d. per lb. higher than last auctions. Smoked sheet sold at 7s. 2d. and 7s. $2\frac{1}{4}$d., and some fine pale biscuit at 7s. 1d., with good scrap up to 5s. 6d.

Other sales included :—

Malay.—Sheets, fair to fine, 6s. $10\frac{1}{2}$d. to 7s. $0\frac{1}{4}$d.; mixed inferior, 6s. 4d. Crêpe, good to fine pale, 6s. $11\frac{1}{2}$d. to 7s. 1d.; fair to good palish, 6s. $8\frac{1}{2}$d, to 6s. $11\frac{1}{2}$d.; light brown and grey, 6s. $3\frac{3}{4}$d. to 6s. $7\frac{1}{4}$d.; clean brown, part dark, 5s. $7\frac{1}{2}$d. to 6s. $2\frac{1}{4}$d.; dark brown, part specky, 4s. 10d, to 5s. $2\frac{1}{2}$d. (5s. $2\frac{1}{2}$d.); black and soft, 4s. 7d. Scrap, fair to fine, 5s. 3d. to 5s. $4\frac{3}{4}$d.; mixed, part inferior, 3s. 10d. to 4s. $10\frac{1}{2}$d. Rambong, fine clean Crêpe, part pressed, 5s. $7\frac{1}{4}$d. to 5s. $7\frac{3}{4}$d.

Ceylon.—Biscuit and sheet, fair to fine, 6s. $10\frac{3}{4}$d. to 6s. 11d. Worms, palish, 6s. 7d. Crêpe, fair palish, 6s. $8\frac{1}{4}$d. Scrap, fair to fine, 5s. 4d.

Orinoco.—Fine, 6s. $3\frac{3}{4}$d. to 6s. $4\frac{1}{2}$d.; entrefine, 6s. $2\frac{1}{2}$d.; nuggets, 5s. $2\frac{1}{4}$d.

Mexican Plantation.—Castilloa clean sheet sold 5s. $3\frac{1}{4}$d.

Colombian and Central American. — Brown scrap, 3s. $8\frac{3}{4}$d. to 3s. 10d.

Uganda.—Clean pressed sheets, 5s. $2\frac{1}{4}$d. to 5s. $4\frac{1}{2}$d.

Madagascar.—Majunga and slab, 3s.; soft gummy ball and slab, 2s. 8d. to 2s. 9d.

Mozambique and Zanzibar.—Lamu ball, mixed to fair, 3s. 6d. to 3s. $9\frac{1}{4}$d.

Statistics for the month of June (tons):—

	Pará.	Caucho.	1909.		1908.	1907.	1906.
Receipts at Pará ..	1,100	470 =	1,570	agst	1,660	1,500	1,650
Shipments to Europe	580	380 =	960	,,	1,050	1,110	850
,, America	750	170 =	920	,,	1,110	930	710

Crop statistics, June 30th, 1908, to June 30th, 1909:—

		Pará.	Caucho.	1908-09.	1907-08.	1906-07.	1905-06.
Pará Receipts	1908-09	30,010	8,080	38,090	36,650	38,000	34,490
	1907-08	29,180	7,470				
,, Shipts.,	Europe	13,570	5,630	19,200	21,740	19,300	20,125
,, ,,	America	16,560	2,490	19,050	14,670	18,730	14,295

Sugar.

MR. C. CZARNIKOW, writing on July 8th, reports that a very quiet tendency has again characterized the market, and, though there was perhaps a little more trade, the volume of business both in actual sugar and in the speculative market has been far below what we expect during our best consuming season.

A little more liquidation of August took place, but did not disturb quotations much, and the sale of a fair quantity only caused a decline of ¾d., of which ¼d. has since been recovered. It remains to be seen how much is left for resale, and what proportion of it will be absorbed by refiners, provided they are willing to pay the equivalent of prices obtainable in the terminal markets, which they have had no need to do during the last two months and more.

Reports about the growing beet crops are, on the whole, satisfactory, though everywhere a certain backwardness continues to exist. There were more selling orders from producing centres, especially Germany and Austria, and these caused prices to decline ¾d. to 1d. for all deliveries, a good trade being done, especially in May delivery, from 10s. 3½d. to 10s. 2¼d., recovering to 10s. 2¾d. From France we hear slight complaints of an excess of moisture.

Business in the United States has been interrupted by the Fourth of July celebrations, and the market remains devoid of animation. The quotation for granulated has been reduced to 4.70 cents, but raws are still quoted 3.92 cents for 96 per cent. Centrifugals = 10s. 3d. c.i.f. for non-preferential 96 per cent. = 9s. 3d. f.o.b. Hamburg for 88 per cent. net beet for arrived sugar, whilst for later shipment an advance of ·03 was established.

In the United Kingdom there is hardly any business to report in cane sugar; refiners find only limited sale for their products, and therefore see no reason to anticipate requirements. Refining grades arrived in the outports have again had to be mostly stored for lack of purchasers. Grocery crystallized is featureless at previous values.

From cane-growing countries there is nothing of special interest. Australian advices confirm that the Queensland crop is very backward, and the present estimate of 140,000 tons may have to be reduced. In Cuba the weather continues favourable for the growing canes.

The total transactions of British West India for the week amounted to about 4,500 bags, including crystallized Trinidad, middling to good middling yellow 15s. to 15. 3d. duty paid, good yellow 15s. 6d. Crystallized St. Lucia, middling yellow 15s., good middling yellow 15s. 3d., good pale 15s. 6d. Crystallized Jamaica, low middling dull yellow 14s. 4½d. Barbados Muscovado, fair grocery 14s. 6d., good palish ditto 15s. to 15s. 3d.

The London Cocoa Market.

By THE EDITOR.

To talk of St. Lucia cocoa being worth 90s. to 95s. would make most of us open our eyes very wide, especially at these times, when prices tend lower and lower. Mr. Geo. S. Hudson, of Errard Estate, St. Lucia, however, sent me a sample of pure Pentagona grown by him in that island, the beans being large, plump, and of perfect break. These were shown to several experts, and all valued them at the same price, 90s. to 95s., stating that, at the Public Sales on July 7th, the only cocoa equal to it was some Colombian, which had 90s. bid.

The St. Lucia sample is at my office, and I shall be pleased to show it to any one interested in the matter. Mr. Hudson has promised to send us some notes on the subject as soon as possible.

Another friend, this time in Haiti, who scientifically cures and prepares his cocoa, and dries it by artificial means, also sent us a sample of 50 bags, just landed at Havre for sale. It was expected to realise 67 francs, and here was at once valued, in spite of rather a large number of small beans, at 54s. to 55s. As ordinary Haiti is only worth about 50 francs, it shows what can be done by care and attention. Such a margin must leave the planter a considerable profit to pay for the extra expense and trouble that he is put to.

Talking of Havre reminds me that that market, according to M. Anthime Alleaume, had a very quiet time, Para, Sanchez, and the finer Haiti meeting with the most enquiries.

Trinidad sellers evidently do not find that there is any more inclination to buy in Havre than in London, where c.i.f. offers of 52s. 6d. to 53s. failed to attract business.

The Havre figures and prices at the end of June stood as follows:—

Havre. June 30.	Stock. 1909.	Value. Fcs.	Stock. 1908.	Fcs.
Pará	13,908 ..	66 to 69 ..	3,998 ..	80 to 84
Bahia	13,769 ..	64 ,, 68 ..	15,438 ..	70 ,, 77
Venezuela ..	38,725 ..	67 ,, 150 ..	32,533 ..	75 ,, 150
Trinidad ..	35,422 ..	68 ,, 70 ..	34,081 ..	79 ,, 82
Other, W.I. ..	7,464 ..	61 ,, 68 ..	11,026 ..	69 ,, 76
San Thomé ..	8,058 ..	66 ,, 69 ..	836 ..	67 ,, 80
San Domingo	18,486 ..	58 ,, 61 ..	7,214 ..	62 ,, 67
Hayti	10,981 ..	50 ,, 63 ..	14,490 ..	55 ,, 65
Accra	13,661 ..	58 ,, 61 ..	9,498 ..	67 ,, 75
Guayaquil, &c.	28,151 G'L	70 ,, 82 ..	18,390 G'L	80 ,, 100
Total ..	188,625 bags.		147,504 bags.	
		July, 1907	64,097 ,,	

In London, on July 3rd, our stock stood as follows:—

London, July 3rd.	1909. Bags.	1908. Bags.
Trinidads ..	17,712 ..	20,017
Grenadas ..	20,579 ..	12,347
Other W.I. ..	5,713 ..	4,607
Ceylons & Javas	20,795 ..	11,960
Guayaquils ..	16,914 ..	12,599
Brazil & Bahia	1,281 ..	1,702
African ..	20,851 ..	9,754
Other foreign ..	11,811 ..	9,240
Total ..	115,656 ..	82,226

On July 10th it had increased to 114,618 bags.

The combined Havre and London stock therefore compares as follows:—

End of June.	1909.	1908.	1907.	
Havre	188,625	147,504	64,097	bags.
London	115,656	82,226	47,800	,,
Total ..	304,281	229,730	111,897	

The Board of Trade figures for June again show a decrease in the deliveries for our home consumption, causing our comparative increase over 1908 to fall below 1,000 tons. Last month I gave the continental consumption to the end of April, since then Holland's figures to the end of May have alone appeared, but they show a further increase, the five months' total being 10,023 tons, against 8,197 tons last year, and 7,063 tons in 1907. Our country, therefore, must turn over a new leaf, and buy more freely than she has been doing. Here are the figures for the United Kingdom :—

Raw Cocoa only—	Landed.	Delrd. H.C.	Exported.	Stock, June 30.
Jan.-June, 1907—	14,028	10,225	2,731	3,180 tons
,, ,, 1908—	17,270	11,214	2,632	6,181 ,,
,, ,, 1909—	21,126	12,187	3,036	11,191 ,,
Increases	3,856	973	404	5,010 ,,

In June only 1,225 tons were delivered for home consumption, against 1,491 tons last year, and 1,412 tons in 1907.

Prices generally tend to decline, though during the week ending July 10th Bahia had taken a slightly firmer turn, and fair West Coast was a clear 1s. dearer up at Liverpool. Guayaquil, after being neglected and difficult of sale, had met with rather more attention at lower rates. Much the same can be said of Trinidads. At auction Grenadas sold freely at undermentioned prices, but Ceylons were nearly all bought in ; later some of the lots changed hands. In Holland Javas also seem difficult to sell, and when business resulted prices moved in buyers' favour.

Values on July 17th ran as follows :—

Trinidads.—Middling to fair good red marks, 54s. to 56s. ; fine good red, 57s. ; and fine marks, 58s. to 60s.

Grenadas,—Good to fine, 53s. to 55s. ; common unfermented to fair fermented, 50s. to 52s. 6d.

Dominicas.—Good reddish, 52s. 6d. ; ordinary unfermented down to 48s.

Jamaicas.—Good red, up to 53s. ; low unfermented down to 48s. or 48s. 6d. Some holders are asking 54s. for their good *forastero* red, but cannot get it.

St. Lucia.—Fine sold up to 54s. ; good red, 52s. 6d.

Demerara.—Fine, 56s.

Costa Rica.—Good reddish is worth 51s. to 52s. ; fair reddish, 50s. to 51s.

Brazil.—Seven bags sold at 46s. 6d.

Panama.—Seven bags realised 60s.

Cameroons.—Sold at 54s. for a pile of nearly 400 fine.

West African is selling at 46s. to 46s. 6d. for fair.

San Thome.—No sales are reported ; nominally the value of fine is 54s. to 55s.

Bahia.—Fair would be worth about 51s., and fine 54s. or 55s.

Ceylon.—Actual sales include good boldish, 63s. ; fair to good medium, 56s. to 59s ; good "Native," 54s.

Guayaquils.—Caraquez sold at 60s. Fair to good Arriba is nominally about 61s. to 67s., and Machala should realize much the same as Caraquez. Further sales include Caraquez at 62s. and Arriba at 64s.

IN Liverpool : 201 bags Peruvian sugar syrups sold at at 9s. 3d. per cwt. quay terms ; 189 bags Maceio (Brazil) at 8s. 3d. quay terms.

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Manufacturing Engineer.

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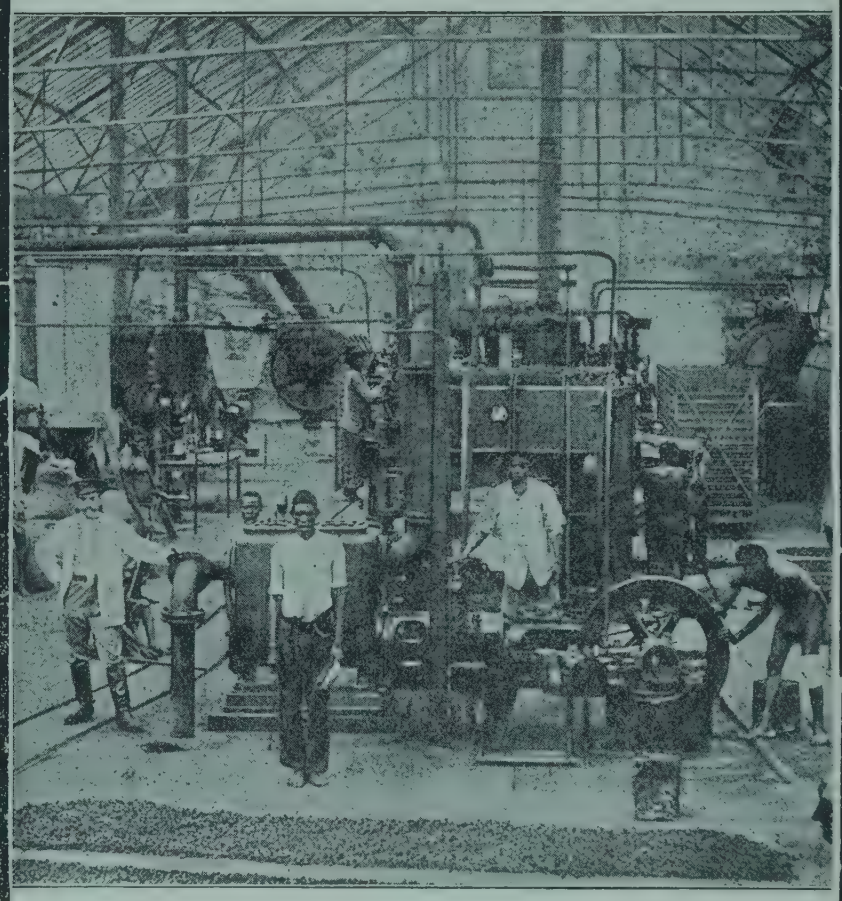

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Tropical Life:

A Monthly Journal devoted to the Interests of those living, trading, holding property, or otherwise interested in Tropical and Sub-Tropical Countries.

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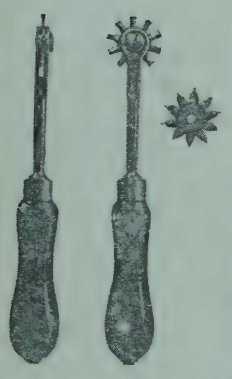

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The Mozambique Company's Report.

WE wish to call our readers' attention to the valuable tables of planting experiments with tobacco, maize, cotton, ground-nuts, &c., published on pp. 122-136, and to the useful work generally, that the Mozambique Company is doing in Portuguese East Africa under the guidance of Colonel Arnold, as Inspector-General of Exploitation, and Mr. W. H. Johnson, as Director of Agriculture.

"Tropical Life" Prize for the best Essay on The Fermentation and Drying of Cacao.

Will those willing to subscribe kindly do so, so as to enable us to offer a second prize of £25.

Since our last appearance we have to thank the Agricultural Society of Dominica for a donation of £2 2s. towards the Prize Fund. As stated last month it is particularly gratifying to see that the planters, as well as the manufacturers and our contemporaries are taking such a keen interest in the matter. One or two manufacturers who we believe will eventually subscribe have not yet done so, but we shall esteem it a great favour if they will send in their names, as their subscriptions will enable us to offer a second prize of £25, which we should be very glad to do.

Meanwhile, we offer, with much pleasure, a first prize of £50 for the best essay on :—

The Fermentation and Drying of the Cacao or Cocoa Bean (*Theobroma cacao*).

The essay should record precisely and in full detail the changes resulting from the processes of fermentation and drying that take place in the bean from maturity in the pod to the time of putting the cured beans into bags for market. Biological as well as chemical changes should be noted. The action of maximum, minimum and optimum temperatures, and of checks producing differences of times in the fermentation and drying processes should be noted for every stage. The differences due to such variations on the resultant cured bean should be clearly traced. The possibility should be discussed of producing at will by such variations, and independently of the natural character of the bean, varieties of taste and of colour, both internal and external, so as to simulate the different kinds of cocoa known on the market. Alterations that might be made in ordinary methods so as to improve the quality of the cocoa should be explained. Waste products should be considered, and their potential value indicated.

The experiments on which results are based should deal with the beans in marketable quantities, and samples should be submitted in illustration of statements made.

The terms on which all candidates enter the competitions are as follows :—

(1) The copyright of all essays sent in becomes the

property of the publishers of TROPICAL LIFE absolutely, whether successful in winning the prize or not.

(2) The publishers of TROPICAL LIFE have the sole right of publishing the essays, and the copyright of such publication to be vested in them. Permission to publish in any language must be obtained from the publishers of TROPICAL LIFE.

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(4) An English translation must accompany all essays not written in that language, so that the onus and risk as to correct translation will rest with the competitor.

(5) Essays must be written on one side of the paper only; when possible the essay should be typewritten. In any case the writing must be clear and distinct. Corrections causing doubt or difficulty to decipher must be avoided.

(6) All essays must be sent to the Editor of TROPICAL LIFE, at his City Office, 112, Fenchurch Street, London, E.C., to reach him on or before January 31st, 1911. No essay arriving after that date will be eligible for competition. Every essay will be acknowledged on receipt.

(7) Every essay sent in must have attached to the head of the first page the competitor's full name and postal address. In submitting the essays to the Judges, the name, however, will not be made known until after the prize is awarded.

(8) After the prize has been awarded any balance left over will be devoted to publishing those essays which, in the opinion of the publishers, are considered of sufficient merit.

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I hereby agree to be bound in all respects by the decision of the Editor of TROPICAL LIFE and the conditions printed above. In case of dispute the Editor's decision to be final and binding.

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The Publishers reserve to themselves the sole right to publish any or all of the essays submitted.

Last Year's Rubber Exhibition.

PUBLICATION OF THE FULL REPORT OF THE CONGRESS. PRICE 11s. 6d. POST FREE.

WANT of space prevents us this month from more than calling the attention of our readers to the above book, which if tardy in making its appearance, has gained in thoroughness by the delay. Anyone interested in rubber should secure a copy independently of the book being a report of last year's congress, for—be it remembered—all the papers have quite lately been revised and brought up to date by the various authors, so that the book is absolutely the very last word on rubber. Those who have contributed papers include all the best known names in the rubber world, such as: Kelway Bamber, J. B. Carruthers, Pehr Olsson-Seffer, H. C. Pearson, Editor *India-rubber World"*; Herbert Wright, Clayton Beadle and Dr. Stevens, Professor Bertrand, Dr. Torrey, Sir Daniel Morris, Professor Jumelle, Professor Lloyd (on Guayule), Dr. Spence, Dr. Tromp de Haas, Dr. Rudolph Ditmar, Dr. Ph. Schidrowitz.

Dr. Spence acted as editor, and no better one could be found, since owing to his knowledge of rubber, and the facility with which he speaks and reads French and German, there were no technical or scientific obstacles that stood in his way. Had everyone sent in their papers promptly, and before he left for America, the book probably would have been out months ago. Next month we shall criticize the lectures. This month we will only say that the book costs 10s. 6d. net., and 1s. for postage. Any reader sending us this amount will receive a copy by return mail. The book runs into 334 pages, and is strongly bound in an attractive green cloth cover, with gilt lettering. It has several plates, and has not been smothered in advertisements. Its full title is "Lectures on India-rubber, being the official account of the proceedings of the Conference held in connection with the International Rubber Exhibition, London, September, 1908."

"Tropical Life"—and Mexico.

IN the introduction that the Editor of TROPICAL LIFE wrote to the paper contributed by Dr. Olsson-Seffer to the Proceedings of the Congress of last year's Exhibition, mentioned above, he included the following remarks, which we believe, coupled with our Editor's foreword to the exhibition catalogue, will go a long way to inspire much greater confidence in Mexico as a rubber producer. "In presenting this paper for publication, I would like to state that Dr. Olsson-Seffer writes expressing his disappointment at the non-arrival of the Mexican exhibits in time for the opening ceremony. Mr. Barrenquy's exhibits,[1] and the later arrivals from the Zacualpa Estates, the Wisconsin Rubber Company, and the 'Esperanza Estate' of the Mexican Rubber Company, Ltd., give one a very good idea of what Mexico can produce in the way of rubber. That from the 'Esperanza Estate,' exhibited by Mr. Levesley, and from the Wisconsin Company, as shown by Mr. Gibson, proves what excellent colour and nerve Castilla can turn out when tapped and prepared by scientific methods. Many visitors thought that the samples from these estates were Hevea, being misled by the appearance of the sheet and biscuits shown. . . . Whatever shortcomings are still to be noticed in some of the Castilla rubber shipped from Mexico, those engaged in the industry are, on the whole, paying the most careful attention to turning out rubber to equal the Far Eastern Hevea in quality and nerve, and scientists in Mexico City and down on the estates are sparing no pains to thoroughly investigate the matter to bring this about."

[1] Of the Orizaba Company.

The Cultivation of Sisal.

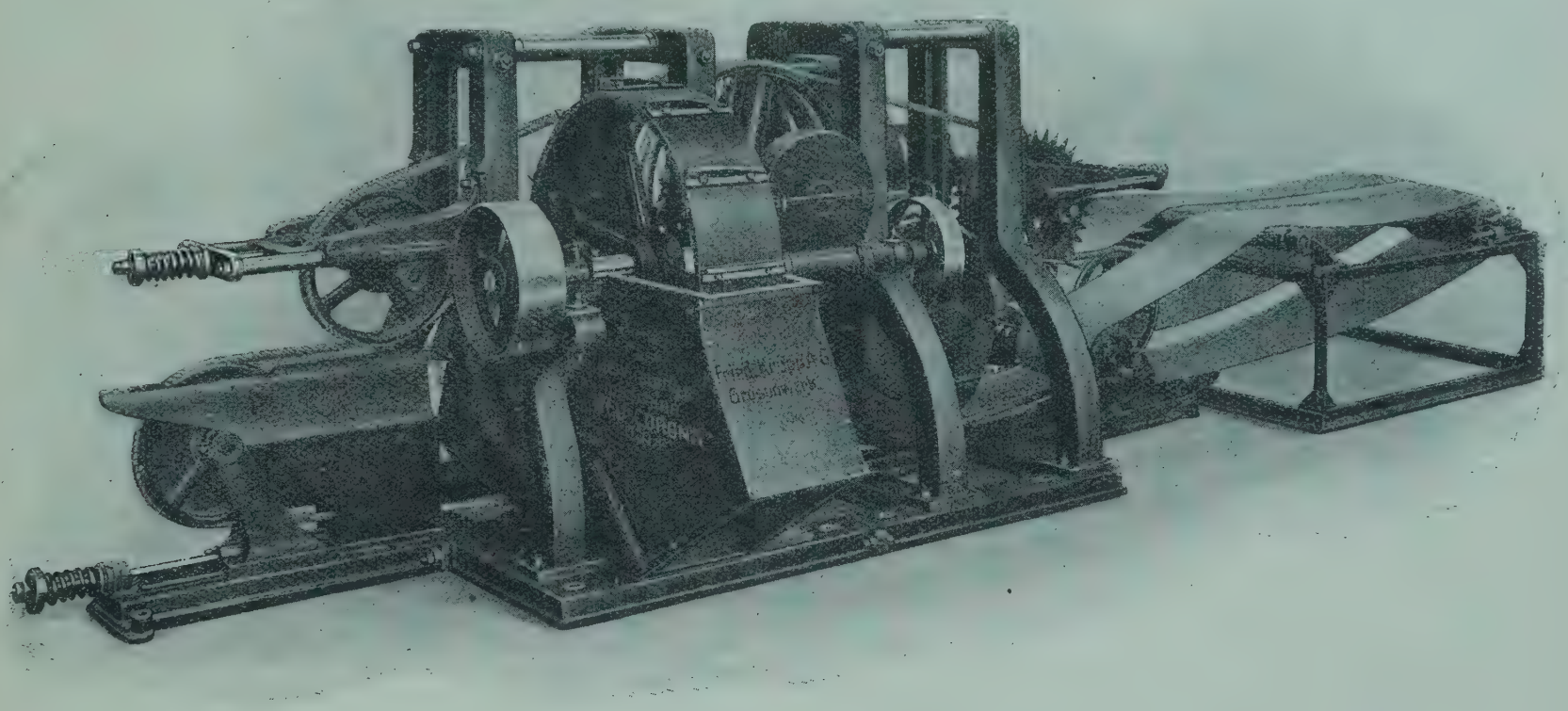
(*Agave Rigida.*)

Part VII.

A reliable machine, really capable of doing the work required of it, is absolutely necessary to assure success for the fibre-planter. A thoroughly satisfactory machine must be able to convey the leaves automatically from start to finish, from the receiving to the discharging end of the machine, and to deliver the fibre perfectly clean, straight, and free from waste and tangles. This can only be achieved when the leaves are gripped in the middle, and not at one end at a time.

With Bœken's "New Corona" machine Messrs. Krupp claim that its erection presents no difficulty, and may be carried out by any fairly skilled mechanic from down the best system of tramlines[1] or overhead ropeways obtainable,[2] along which to transport the leaves.

It is only by such means as these that the leaves on a large estate can be brought with sufficient rapidity to the machines to be cleaned. The new "Corona" machine mainly consists of two scutching drums armed with scrapers working against concentrical cast-iron saddle pieces lined with brass, along which transport cables pass over grooved pulleys to convey and hold the leaves during the process of decortication. These pulleys are provided with means for automatically maintaining the tension of the conveyor cables. The machine can either be driven from a shafting, or direct from an engine. The two scutching drums are driven by separate belts, whereas the two sets of conveyor cables are operated by means of a worm-gearing set in motion by a third belt. A pair of broad conveyor belts mounted in front of the machine and actuated by it serves to ensure uniform feeding.



The New Corona Sisal Cleaning Machine, with Cover removed to show the Blades on the Drum.

the designs and instructions sent out with each machine. About a 30-b.h.p. is required if the machine is to be worked at its fullest capacity. Besides this, on large estates, or in the case of a central cleaning station, it is advisable to allow for a sufficient margin of power to work the baling press, pumps, &c. With 30-b.h.p. the "New Corona" has been known to clean over 130,000 leaves of the true Sisal in a working day of ten hours, the output of fibre so obtained being, we believe, returned as 4,000 lb. The output of a machine, however, depends very much upon the nature of the plant to be treated, upon the length, width, and weight of the leaves, and the proportion of fibre contained in them. Very much—perhaps more than anything—depends upon the freshness of the leaf, that is, upon the rapidity with which it can be brought to, and put through, the machine after being cut. Every five minutes that intervenes causes quite a difference in the toughness of the leathery outer covering. Perfection on this point can only be gained when the machines can accompany the cutters; until that happy day the planter must rest content with laying These belts bring the leaves within the reach of the upper and lower conveyor cables, which seize them near their centres, and by doing so press the leaves in such a manner that one-half of the leaf hangs down on either side of the lower conveying cable. The half hanging down on the right side of the lower conveyor cable is pulled through between the brass-lined cast-iron piece and the first scutching drum, and is there decorticated, whilst the other half is carried along the outside of the saddle piece. On leaving the first scutching drum, the part of the leaf already treated comes within reach of the second set of conveyor cables, whilst the other part is then brought under the action of the second scutching drum where it is treated in a similar way. In this manner the whole length of the leaf is thoroughly decorticated and the fibre extracted before it leaves the second drum. The lower cable of the second conveyor set may be carried further to a suitable length, to ensure the easy removal

[1] Decauville's or Arthur Koppel's, Ltd.
[2] See Tropical Life for April, p. 52.

of the clean fibre as it leaves the machine. The pulpy matter and droppings from the scutching drums drops into the gullies or carts, and can thus be easily removed. This is a waste product at present, but we hope that investigations may lead to its being utilized for fertilizing the land from whence the leaves come, if for no other purpose. Even for this there should be a good use, as the land will benefit by its return.

WASHING SISAL.

If machines can be devised, says Mr. Lyster H. Dewey for cleaning (*Palma istle*) fibre in a satisfactory manner, it is thought that the thousands of acres of lechuguilla plants in Western Texas may be profitably utilized. In Yucatan the waste is fed to cattle, which are turned into the mill yard at night, when they are reported to thoroughly clean up the pulp and waste fibre turned off by the machines during the day. In Hawaii the waste fibre is first separated from the pulp with an ordinary pitchfork.[1] It is then steamed, washed, and dried. This requires so much time and labour that the

BALED SISAL, READY FOR SHIPMENT.

utility is doubtful. The use of a reliable fibre-extracting machine would, however, enable this waste to be extracted at a very low cost in comparison, and so enable it to be regularly utilized for paper-making purposes.

Dr. Harold Mann[2] very rightly, in our opinion, calls attention to the objectionable nature of large deposits of pulp and refuse from the machines if allowed to remain undisturbed. The refuse from Mauritius hemp (*Fourcroya* or *Furcræa gigantea*), he tells us, is even more objectionable than that from Sisal. The advantage of using a large machine at one central factory is that the refuse can be fed into trucks, and straightway conveyed back into the fields and used as manure, or it can be pitted until needed. "This waste," says Dr. Mann, "is abnormally rich in mineral constituents," as the following analysis by Mr. D. Hooper shows. (See also Dr. Heim and M. Hébert's analysis in Part VI., TROPICAL LIFE for July, p. 99.)

Water	81·33
* Chlorophyll, &c.	·67
Albuminoids	2·26
Carbohydrates, Digestible Fibre, &c. ..	10·81
Fibre	·69
† Ash	4·24
	100·00

* Containing Nitrogen ·36.
† Containing Phosphoric Acid ·20.

The waste also has a certain insecticidal action. In any case it must be removed from the factory at once, so as to become of use instead of a nuisance.

Manihot Rubber Trees.

PART II.

MANIHOT GLAZIOVII OR CEARÁ.

THE important article published last month on the new Maniçoba rubbers, has made us turn up our literature on the Ceará tree, to see if his future is doomed, as Dr. Ule's verdict on him would make one believe is the case. The *M. Glaziovii* has, however, many friends still who show no signs of losing sight of him. Mr. Richard Ott, of Nicaragua, who visited the Rubber Exhibition last year, has now returned to Central America to lay out extensive areas in this rubber. Previous to his departure we had many conversations together on the subject, at each one of which Mr. Ott seemed to emphasize his belief in the Glaziovii above all other kinds, so far as his district was concerned.

Mr. Jared Smith evidently also believes in Ceará for the Hawaii,[1] for he writes: "The Ceará variety of rubber tree grows in Hawaii better than in its native habitat. The rapidity and vigour of growth on our plantations are remarkable. Many trees show a growth of from 10 ft. to 15 ft. or more during a single season, with girth measurements in proportion. . . . . The methods of tapping which this station has developed, and the preliminary experiments already made, indicate that healthy average trees of the Ceará variety, which have attained a trunk diameter of 6 in. to 8 in. at 3 ft. from the ground, will yield from 5 lb. to 10 lb. or more of crude rubber per annum. The Ceará variety seems better adapted to Hawaiian climate, soils, and conditions than any other rubber-producing tree which has as yet been introduced. Its extreme rapidity of growth and its adaptability to widely varying conditions of climate, its large yields and its early maturity, indicate that its cultivation will be the most advantageous." All the same, the natural home of the Ceará tree, according to all accounts, is in the dry regions of Brazil. It takes its best known name from

[1] "The Cultivation of Maguey in the Philippines." By Mr. H. T. Edwards, Bureau of Agriculture, Manila, Philippine Islands.
[2] "Sisal Hemp Cultivation." Indian Tea Association, 1904, Calcutta.

[1] "The Ceará Rubber Tree in Hawaii." By Mr. Jared G. Smith and Q. Q. Bradford. *Bulletin* No. 16. Issued July 3rd, 1908. Hawaii Experimental Station.

the State of Ceará, as well as its native name of Maniçoba rubber.

In British East Africa extensive plantations are being established in many parts of the coast-belt with every prospect of success.

It should not be forgotten, Mr. R. Derry, Commissioner for Malay to the Rubber Exhibition in London, tells you[1] that this rubber, when well prepared, obtains the highest price. It was the novelty of the Lanadron block rather than intrinsic quality that obtained for it the gold medal over a sample of Ceará rubber. It grows best in dry, tropical countries on the poorest soils,[2] and if it can be successfully cultivated, it would have to be reckoned with as a rubber of the finest grade. Analysis shows :—

Caoutchouc	82·8 to 85·6 per cent.
Resin	5·5 ,, 6·3 ,,
Proteids	6·2 ,, 9·4 ,,

Ceará Rubber Tree, Three Years Old.

The possibilities of Ceará rubber as a sound investment in the Bahamas are generally recognized,[3] and many farmers are planting it, one estate having already planted fully 50,000 seeds, and 60,000 more have been sent over to the Islands. During 1907 the Bahamas apparently imported about 200,000 seeds. The trees planted in the Botanic Station were doing well. One, Mr. Cunningham reports, that was imported from Jamaica, and planted on June 16th, 1906, is 11½ ft. high, and trees planted on June 24th, 1907, from Ceylon seed, were 5 ft. high on January 23rd, 1908. In Hawaii, 400,000 rubber trees are returned as having been planted, and of these upwards of 360,000 (over 90 per cent.) were *Manihot glaziovii*.

[1] *Agricultural Bulletin of the Straits and Federated Malay States*, February, 1909.

[2] This does not say that the tree cannot and does not respond to nourishment and moisture.—Ed. *T.L.*

[3] *Bulletin of the Agricultural Department*, Bahamas, March and April, 1908. Edited by the Curator, Mr. W. Munro Cunningham.

Notes on Present Condition of the Castilla Rubber Industry.

By Dr. Pehr Olsson-Seffer.

Part V.

The centrifugalization of rubber latex is not believed in by most planters. The main reason for this is that the eastern planter has to do mainly with *Hevea*, and with this latex the method cannot be employed. The latex globules do not separate nearly as readily as in the case of *Castilla*. Visitors to the Rubber Exhibition were also shown, through the microscope, how very much smaller the Hevea globules are than those of the Castilla tree. So far the smallness of the Hevea globules has prevented centrifugal separation being possible, but a day may come when it will be.

When coagulation of the latex has taken place we find that the caoutchouc globules have adhered, forming a network without any regularity. In this net are held albuminous matters and resins. This indicates that the manner in which we should get rid of these substances is to wash the partly coagulated latex at the right moment before they have been enclosed to such an extent as to make their expulsion difficult. This takes place if the coagulation process has been allowed to proceed so far as to allow the caoutchouc globules to completely surround these foreign substances.

The latest method of preparing rubber on a commercial scale is one which I developed after numerous experiments at La Zacualpa Botanical Station and Rubber Laboratory. This system has recently been patented, and is as follows :—

The latex, when brought in from the field, is weighed on scales placed on an elevated platform. It is then poured into the latex-receiving tank, where it remains until the coagulation process begins. If it is necessary to keep the latex from coagulating for some time, a small amount of formaldehyde is mixed with the latex.

From the receiving or storage tank the latex passes into a centrifugal strainer, in which all mechanical impurities are separated. The latex now runs into a special coagulating conveyer. This coagulator is provided with a steam-heated jacket, so that the temperature of its contents can be raised. The latex is mixed with an equal quantity of water, and an alcoholic solution of creosote is added, in order to thoroughly disinfect the resulting rubber. The temperature is raised to about 50° C., and the latex is slightly stirred by the movement of the conveyer. When the rubber commences to coagulate, which process begins in about twenty minutes, it is forced by the conveyer into creaming vats, where it is allowed to stand for a short while. The latex is further diluted with water, entering at the underside of these vats. Upon being allowed to rest a creaming begins, and when separation has taken place some of the serum is drawn off from the lower part of the vat, and fresh clean water added from below. This washing of the cream is repeated several times, in order to separate as much of the resins, contained in the latex (and which have been kept in a fluid state by the warm water), as is possible. By the creaming process many of the readily decomposing albuminoids are washed away. Finally the cream is allowed to rise, and the surface is raised by the injection of water, allowing the cream or partly coagulated rubber to run over an overflow lip on to tables fixed beneath the lips of these vats. The rubber is partly worked by hand with

small wooden spades, and the freshly coagulated lumps are then passed to the washing machines. In these the rubber is pressed between heavy steel rollers, separated about ¼ in., and at the same time it is further washed with water. The rubber is put through these machines several times, while the distance between the rollers is decreased, until it becomes compacted from the pressing, and emerges from the rollers as a continuous sheet of crêpe rubber. Where a differential rate of movement of the two roller surfaces is adopted, the rubber is subjected to a stretching and tearing, which causes mechanical impurities to be thrown out. This, of course, takes place only in the case of scrap and chip rubber, while rubber produced from the fluid latex treated by machinery has been thoroughly cleaned from all mechanical impurities in the centrifugal strainer and in the settling tanks. This latter rubber is, however, greatly benefited by passing through the rollers, as in this washing process a large part of the proteids and resins is washed away.

All serum or washing water drawn off is passed through a separator, in which all the rubber contained in the water is extracted by centrifugalization. The strips of crêpe referred to are then placed into a vacuum dryer, and remain in this vacuum chamber for one and a quarter to one and three-quarter hours. The steam is shut off some fifteen minutes before the rubber is dried, allowing the heat of the metal to complete the drying until only 6 or 7 per cent. of moisture remains. At a vacuum of 28½ in. the temperature of the rubber is about 90° F., and remains so until the greater part of the moisture has been removed; it then slowly rises, and is taken out when the temperature reaches 120° F. Great care has to be exercised so as to prevent overheating of the rubber. The strips of dry rubber are then folded and placed in the box of a hydraulic press, in which a sufficient pressure is applied. In this manner a block of rubber is obtained which contains the maximum amount within a minimum space. In order to keep the presses continually going, interchangeable boxes are introduced, and by a duplicate bridle arrangement, fitted with four strong screws, the inverted name-plate, for branding the rubber, is held down by these screws and easily relieved from the foot of the press. The press ram screw is then raised, a new name-plate inserted, and another box placed in position. After pressing, the boxes, with the rubber still under pressure, are taken to another stove for "fixing," and then by simply unlocking the hinged base the pressed, branded, and finished block is thrust through the bottom. These rubber blocks are made of a standard size, and packed in suitable standard packing-cases, well planed on the inside, and they are then ready for shipping. The sizes of the boxes vary. A convenient size is 9 in. by 11 in.; the thickness of the block is generally equal to the depth of the box, which can be dismantled so easily that there is no difficulty in transporting the various parts. The press can also make a block of any thickness from 1 in. to 6 in., depending upon the first packing of the crêpe in the box.

Both scrap and chip rubber are passed through the washers and turned out in form of low-grade crêpe, which is afterwards blocked. The adopting of this latex plant brings the following advantages:—

(1) The rubber produced is of uniform quality.

(2) The rubber is as pure as it can be made by mechanical means.

(3) The process effects a saving of labour, in that very little manipulation is necessary.

(4) The process saves time in drying the rubber, which means a saving in storage room and labour.

(5) The rubber, being pressed in blocks of uniform size, exposes a minimum surface to the atmosphere; it is easy to pack, and takes a minimum of room in shipment, thus reducing the freight.

(6) The rubber arrives in the market perfectly clean, and can be used immediately by the manufacturer.

(7) The rubber thus prepared commands a higher price than any rubber made by previous methods.

The rubber prepared by this method has been pronounced fully equal to the best hard cure Pará, which, as is well known, is the best rubber on the market. The prices offered for this new *Castilla* rubber are higher than current prices for ordinary Pará. One of the greatest imperfections of rubber is the presence of a large proportion of soft resins, that is, resins with a low melting point. The percentage of such resins in *Castilla* rubber has varied from 8 to 41 per cent. By this new method of preparation the amount of resin can be lowered to less than 3 per cent. This new rubber therefore fulfils all the requirements placed upon rubber and rubber articles by the British Admiralty.

Manilla Hemp.

FIBRE PRODUCTION AS SEEN IN DAVAO, PHILIPPINE ISLANDS.

By MAX L. MCCOLLOUGH,
Secretary Davao Planters' Association.

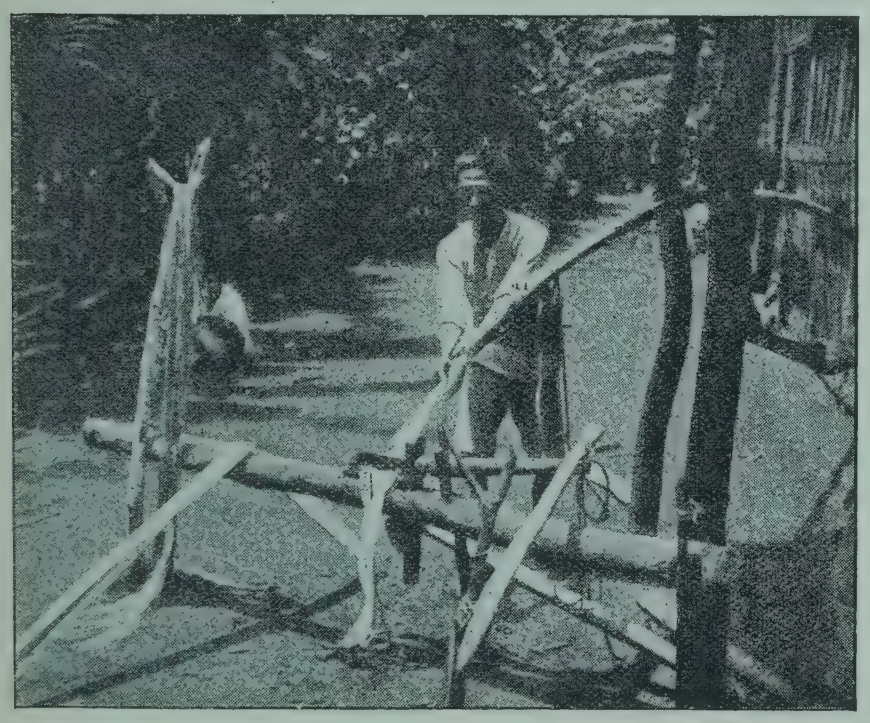
PART III.

THE NEW ORDER OF THINGS.

SUCH, in brief, is the laborious method by which the 200 tons of Manilla fibre which is exported monthly from the district of Davao is produced. Such, with slight modifications, is the way in which is produced the 115,000 tons of fibre shipped in 1907 from the whole of the Philippine Archipelago. It would be giving a false impression to speak of this method as the old order; it is the present order of things, and, with very slight exceptions, the only order of things in hemp production in the Philippine Islands. However, here and there changes are taking place. A new leaven has begun to work, and although hidden away in Southern Mindanao, in a comparatively unimportant hemp-producing district, it bids fair, not to leaven the whole lump of native hemp producers in the islands, perhaps, but at least to have an important influence on the development of new plantings and future fibre production. It is the application of science and invention to old-time methods, the entrance into a field of production hitherto overlooked, or at most casually glanced at, of the spirit of modern thought and enterprise. Why should not new study and new inventions do for Manilla hemp what the McCormick self-binder and the combined harvester have done for wheat? Why in an age when labour-saving machinery plays such an important part in the processes of production and distribution of the world's commodities should the hemp raiser be satisfied with the old-time methods of "the man with the hoe"? Why not bring to this problem the knowledge gained in other branches of agriculture and apply it in such a way as to meet local conditions and bring forth new and larger results? Why, to be more specific, in a land where labour is scarce, should not modern agricultural machinery, modern lines of transportation and labour-saving harvesters be used? Why

not by their use be able to conduct large plantations along modern lines, and so permit of scientific management and a lesser cost of production?

Such questions have their own answer from some of the advanced spirits of the Gulf of Davao country. There one may get glimpses of the new order of things which seems destined to exert an ever-increasing influence on the present *régime*. There one may see in place of the axeman the ploughman turning over the sod with improved ploughs drawn by the patient but reliable oxen. One may see the other processes of agriculture carried on by means of spring-tooth and disc harrows and one-horse five-tooth cultivators, all drawn by animal power and driven by natives who, once they are taught, make very satisfactory labourers. The young hemp plants are set out in long, straight rows over a well-pulverized field clear of all roots, stumps, snags or grass, and well fenced with woven wire hog-proof fence. A near-by stream has been tapped and ditches made, thus bringing under irrigation the growing crops. A hemp-



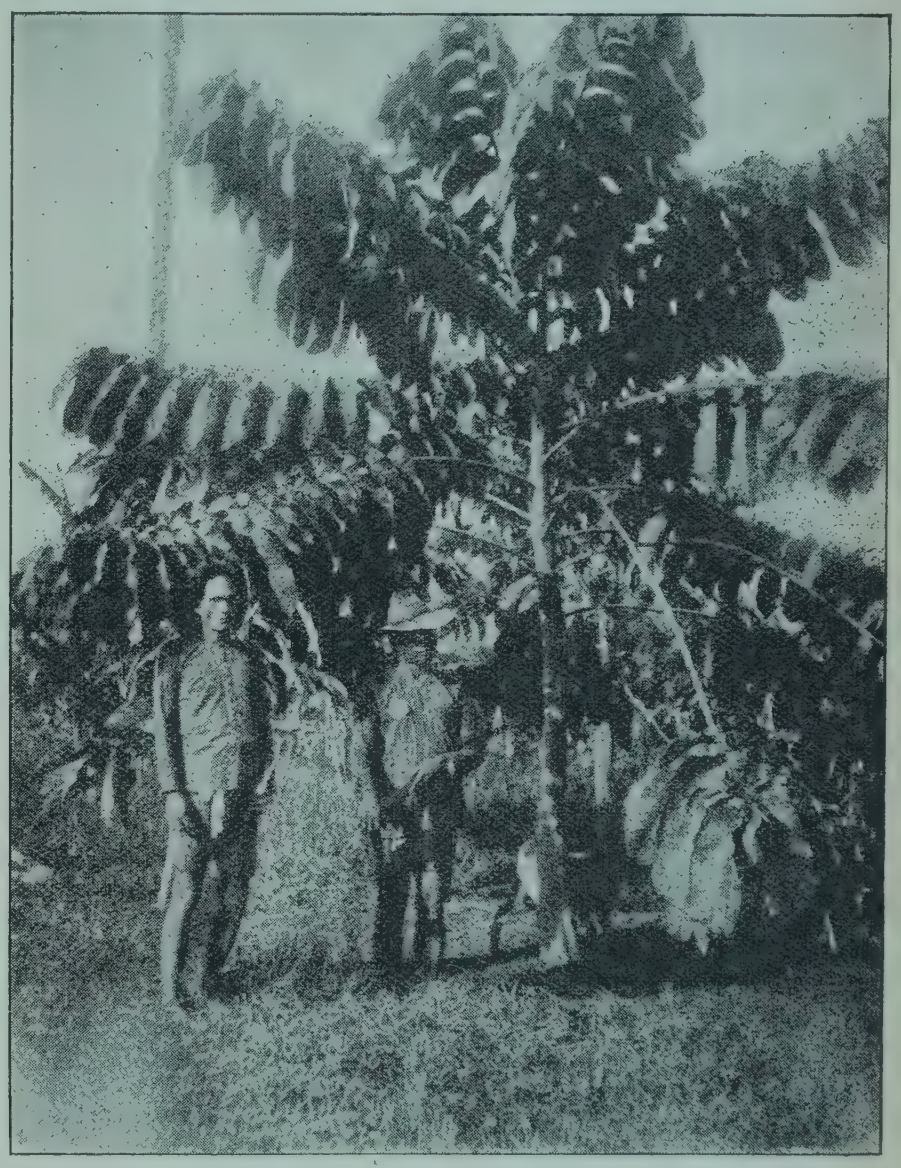
From photograph in "Journ. of Science," Philippine Islands.]

Native Method of Stripping Manilla Hemp.

stripping machine run by steam power stands ready to do the work of sixty men, besides saving much of the fibre which by the hand method is lost entirely.

The Director of Agriculture of the Philippine Islands, in the July, 1908, number of the *Philippine Agricultural Review*, writes editorially of this country: "In Davao, more often than in any other part of the islands, we have an opportunity to observe what results can be obtained with abacá where favourable soil and climatic conditions are combined with high cultivation, irrigation, and wise and careful management. The returns of the Planters Association indicate an average yield of 18 piculs of fibre per 1,000 hills of hemp (one hectare), with yields of from 30 to 40 piculs per hectare under exceptionally favourable conditions. At one time it appeared that the labour situation might seriously hamper the work of the planters, but conditions have been so greatly improved that there is now no cause for anxiety. . . . The more general use of labour-saving machinery will permit of development without greatly increasing the demand for labour."

Manilla hemp holds a place prominent among the vegetable fibres of the world. From almost any point of view except that of price it excels. When prepared in the right way the fibre in quality and strength ranks high above its competitors, and is taken in preference to them by buyers in the markets of the world. But owing to the fact that abacá is grown by 10,000 native farmers scattered over many of the islands of the Philippines, where any adequate control of the quality of the fibre produced is next to impossible, buyers of the fibre in London and New York have long had good cause for complaint. Good "Manilla" has been so high in price that cheaper fibres, such as Sisal, have found an ever-increasing demand. As greater amounts of Manilla fibre are turned out—owing to the use of machinery, for

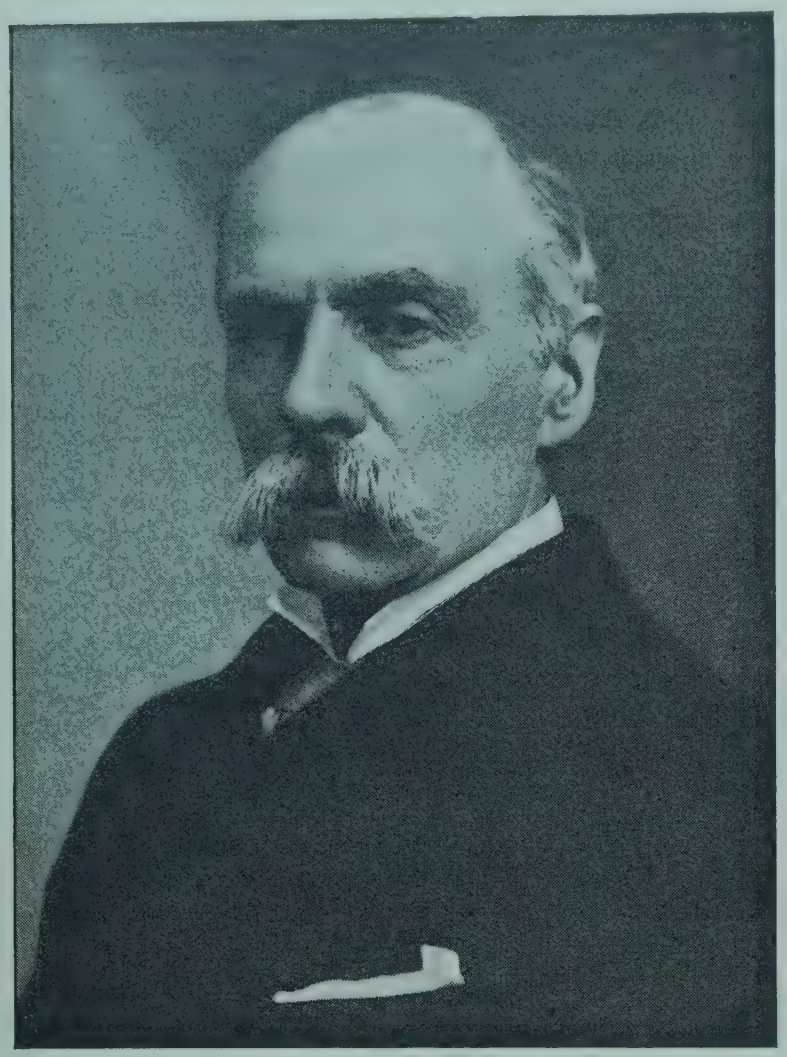


Castilloa Elastica.

Rubber tree, two years old, on an estate in Davao, Philippines.

example—the price may have a tendency to drop. If this be the case, as the price approximates that of the inferior fibres a greater demand for Manilla will be experienced, which will, perhaps, keep the price somewhere near the present figures. Where production is on a large scale, more attention can be given to the preparation of the highest grade of fibre. This grade of fibre has been found to be the most remunerative to planters generally.

Mr. J. Hinchley Hart, F.L.S., started a series of articles on Cacao in the West India Committee Circular of July 20th. Readers of Tropical Life will do well to join the Committee in order to obtain the circular with the valuable information these articles contain.



"Tropical Life" Friend.—No. 50.

PROFESSOR W. J. R. SIMPSON, M.D., C.M.G.,

Professor of Hygiene, King's College, London, Co.-Editor of *Journal of Tropical Medicine.*

WE made Professor Simpson's acquaintance at the dinner given in his honour at the Criterion Restaurant, by the West African Section of the London Chamber of Commerce, in order to allow Sir Patrick Manson, Sir Ralph Moor, Mr. F. Swanzy, and others, well able to speak on the subject, to express the sentiments of all present and many others unable to attend, on the good work that the Professor had been doing on the West Coast of Africa, from whence he had just returned.

If practice makes perfect, then Professor Simpson must be as near perfection as is possible to attain, when it comes to a discussion or investigation on sanitation or hygiene in the Tropics or elsewhere, for he has had many years' practice, the whole of his professional life having been, unless we are very much mistaken, occupied in investigations connected with the prevalence of disease among large communities, and the practical application of sanitary science to towns and villages. From all that we can remember of the work that Dr. Simpson has already done, no one has had a wider experience on the question of public health.

As Medical Officer of Health for Aberdeen, he organized a health department for that city, and traced a number of cases of scarlet fever and typhoid fever to contamination of the milk, and introduced reforms to prevent a recurrence of the disease. Later he gave evidence before the Royal Commission on the Housing of the Working Classes, and recommended reforms that effectually stamped out typhus fever from Aberdeen.

His first appearance in connection with tropical hygiene was in 1884, when he visited Egypt to study the epidemic of cholera then prevalent there. From his investigations at Damietta, an important town on the Rosetta branch of the Nile, he was able to trace the primary source of the epidemic in Egypt to the importation of the disease by pilgrims, who among other things contaminated the water, and so caused the disease to spread elsewhere as well.

Next proceeding to Calcutta, he had among its million of inhabitants plenty of scope for his powers of administration and the scientific application of modern methods of fighting cholera; he not only organized a large health department of an administrative character, but also conjoined with it a Public Health Laboratory and Investigation Department, the first of its kind in India or elsewhere. It was by the methods of research introduced that it was demonstrated for the first time that infected milk was an important agent in the causation of cholera. The value of inoculation was also worked out and its operation as a preventive measure brought into the region of practical politics.

Visiting Australia in 1888, Professor Simpson was asked to investigate the cause of typhoid fever in Melbourne, which he showed was caused by water contamination.

Sometimes "Our Friend's" proposals were not always carried into effect at once, not until, in fact, it was discovered what a mistake had been made in neglecting to adopt them: when in India, for instance, he drew up a scheme for the creation of a sanitary service for India, which though accepted at the time was only recently brought into being. When plague broke out in Calcutta, he was able to stamp out the disease by realizing the relationship between the rat plague and human plague, and by taking stern methods for exterminating, as far as possible, the infected rats. In 1898 "Our Friend" was appointed Professor of Hygiene at King's College, London, and in the following year he began, with Sir Patrick Manson and Mr. Cantlie, the first courses of lectures at the London School of Tropical Medicine. The few students then attending have steadily increased until even the present accommodation, which is far in excess of that which formerly prevailed, is totally inadequate and sadly needs further extending. During the South African War, Professor Simpson was appointed a member of the Commission sent to enquire into the prevalence of dysentery and enteric. Whilst he was there plague broke out at Cape Town, and "Our Friend" was placed by the Government in control of the operations until the disease was stamped out. Later he enquired into the causes of plague in Hong Kong; after that he reported on the sanitary conditions of Singapore and Penang, and, as already stated, he last year visited West Africa, primarily to deal with the outbreak of plague on the Gold Coast, and secondarily to report on the sanitary conditions of some of the principal towns and trading centres in Sierra Leone, the Gold Coast, and Southern Nigeria. Truly, therefore, can we say that the Professor is a friend of the Tropics and to those who have dealings therein. We are glad to be able to state that with modern methods of dealing with sanitary matters on the Gold Coast "Our Friend" predicts a bright future for West Africa.

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Tropical Life.

AUGUST, 1909.

The British Cotton-growing Association.

THE fourth annual report of the British Cotton-growing Association for the twelve months ending December 31st, 1908, is more than usually interesting. The illustrations, nine in number, greatly help to fix the facts contained in the printed matter on one's mind. Especially good progress has been made, we are told, in Uganda.

As stated in the last report, the Council did not feel justified in continuing the expenditure on canvassing. The total amount of shares subscribed for on December 31st, 1908, amounted to £261,195. Although the financial resources of the Association are sufficient for the present commitments, the Council are of opinion that additional capital will shortly be needed, more especially in view of the rapid extension of cotton growing in Uganda, and of the immense field which will shortly be opened when the Northern Nigeria Railway reaches Kano.

The Council regret exceedingly that the depression in trade, following the financial crisis in the United States, has had a most serious effect on the transactions of the Association during 1908, and this was much aggravated by the dispute in the Lancashire cotton industry. During the latter part of the year especially cotton was difficult to sell, and could only be disposed of at low prices. It is to be feared that this may have the effect of discouraging, and will certainly check for a time, the development of new cotton fields. There are, however, distinct signs of improvement in trade, and it is to be hoped that the present depressing conditions may soon disappear, and that there may shortly arise a steady demand for cotton goods, and consequently for raw cotton.

In commenting on the report, the *Manchester Guardian* very truly says :—

"The year of a bumper American cotton crop and an unusual dulness in the cotton-goods trade is not the most favourable for an appeal by the British Cotton-growing Association for the financial support of Lancashire. But a great permanent enterprise cannot be allowed to languish because of temporarily unfavourable conditions, and if the enterprise of the British Cotton-growing Association was worth initiating seven years ago, it is much better worth carrying on to-day, when at a great expenditure of money and effort the work of research and experiment has been accomplished and the stage of fruitful development reached."

Manchester also has expended vast sums on her cotton looms and the buildings to cover them since the Association started. As we pointed out in our October (1908) issue, it has been estimated that since 1904 at least £15,000,000 has been expended in laying down new spindles and looms. These machines all need increased supplies of raw cotton to feed them, and because over-production and the American speculation may temporarily disturb the market for a time, neither spinners nor growers must be discouraged and be led to believe that this will last for ever. Far from it; the greater the force, the greater the reaction. Now, in the period of comparative slackness both sides should be prepared for better times. Twelve, or even three, months ago who would have believed that bread in London would be worth 8d. the quartern loaf, with every chance of the price going still higher? The same as the world-supply of wheat has fallen short so unexpectedly, so, so far as the English looms are concerned, can cotton run short again; and as the main object of the British Cotton-growing Association is to help Manchester to avoid being "cornered" owing to the American speculations (as she was when the Association started, and as Mr. Patten has done with wheat, causing the whole world to pay dearer for its bread), it will be a great mistake if the Association is not well supported.

We would also give a word of advice to the Association itself, since the price of cotton affects England generally. Why does the Association persist in burying itself away in Manchester—why not have a meeting occasionally in London? There is still a little money left in London for investment. We would advise the Council to hold meetings and to arrange that an annual dinner, either in connection with the London Chamber of Commerce or independently, be held in London as well as in Manchester. Such a proceeding cannot fail to attract more capital to this excellent undertaking. We suggested this to Sir Alfred Jones, and he expressed his willingness to come; therefore, why should not others?

———

THE American Government Report showed that the condition of cotton in America on July 25th was as 71·9, against 83 last year, 75 in 1907, and 82·9 in July, 1906. This compares with a ten-year average of the July condition of 80·6, and indicates practically a cotton crop of not over 11,500,000 bales, as against previous estimates of 12,500,000 bales. This caused the price of cotton at the time to jump up about 35 points following the report, and remained strong till the close, with the bulls predicting 13 cent cotton this week. The cotton acreage this year is 31,918,000 acres, against 33,370,000 acres last year, which yielded 13,587,306 bales. Apparently the world's cotton requirements will be 2,000,000 bales more than the yield, and this deficiency is expected to cause a great advance in prices from the present levels.

Planting Experiments at the Agricultural Experimental Station, Zimbiti (Mozambique).

By W. H. JOHNSON, F.L.S. &c.,[1]

Director of Agriculture to the Companhia de Moçambique.

THE Zimbiti Station is the first of the three Agricultural Experimental Stations which the Companhia de Moçambique has decided to establish for the purpose of testing the agricultural possibilities of the three different zones in its territory. It is situated in the Low Country, 35 kilometres distant from Beira, and is adjacent to the Beira and Mashonaland Railway. The soil in this neighbourhood varies from a light, sandy alluvial to a rich, heavy clay. A stream flows through the centre of the site selected for the station, and the land in the vicinity of this was thickly covered with large timber trees.

The station is named after a timber tree which is very common in the neighbourhood and known to the natives as Zimbiti. Botanical specimens of this tree were forwarded for identification to the Royal Botanic Gardens, Kew, which resulted in eliciting the fact that it is new to science, and it has been distinguished by the Kew authorities as *Androstachys Johnsonii*, Prain.

It was intended to clear about 20 hectares for preliminary experiments, but as the commencement of this work was delayed until November 18th, 1907, by which time the rainy season was well advanced, it was only found possible to prepare about half this area for the first season's cultivation. The remainder was, however, cleared and prepared for planting before the end of the year (November, 1907, to November, 1908), the period covered by this report.

DEMARCATION OF LAND.

The selected area was divided up into twenty square blocks, each measuring 1 hectare, and each of these was subdivided into square plots containing $\frac{1}{16}$ of a hectare.

The hectare blocks were numbered consecutively from 1 to 20, and the small plots were given a letter of the alphabet from A to P, as shown in the plan sent in with the report.

This system of demarcation considerably facilitates reference to any particular area, and will enable a correct record to be kept of the crops grown in successive years on every portion of the station. Such a record is of considerable importance in estimating the effect of various crop rotations.

SUPERINTENDENT'S HOUSE
Agricultural Experimental Station, Zimbiti, August, 1908.

STAFF AND LABOUR FORCE.

The European staff consisted of the Superintendent and his assistant, and fifty native labourers were constantly employed.

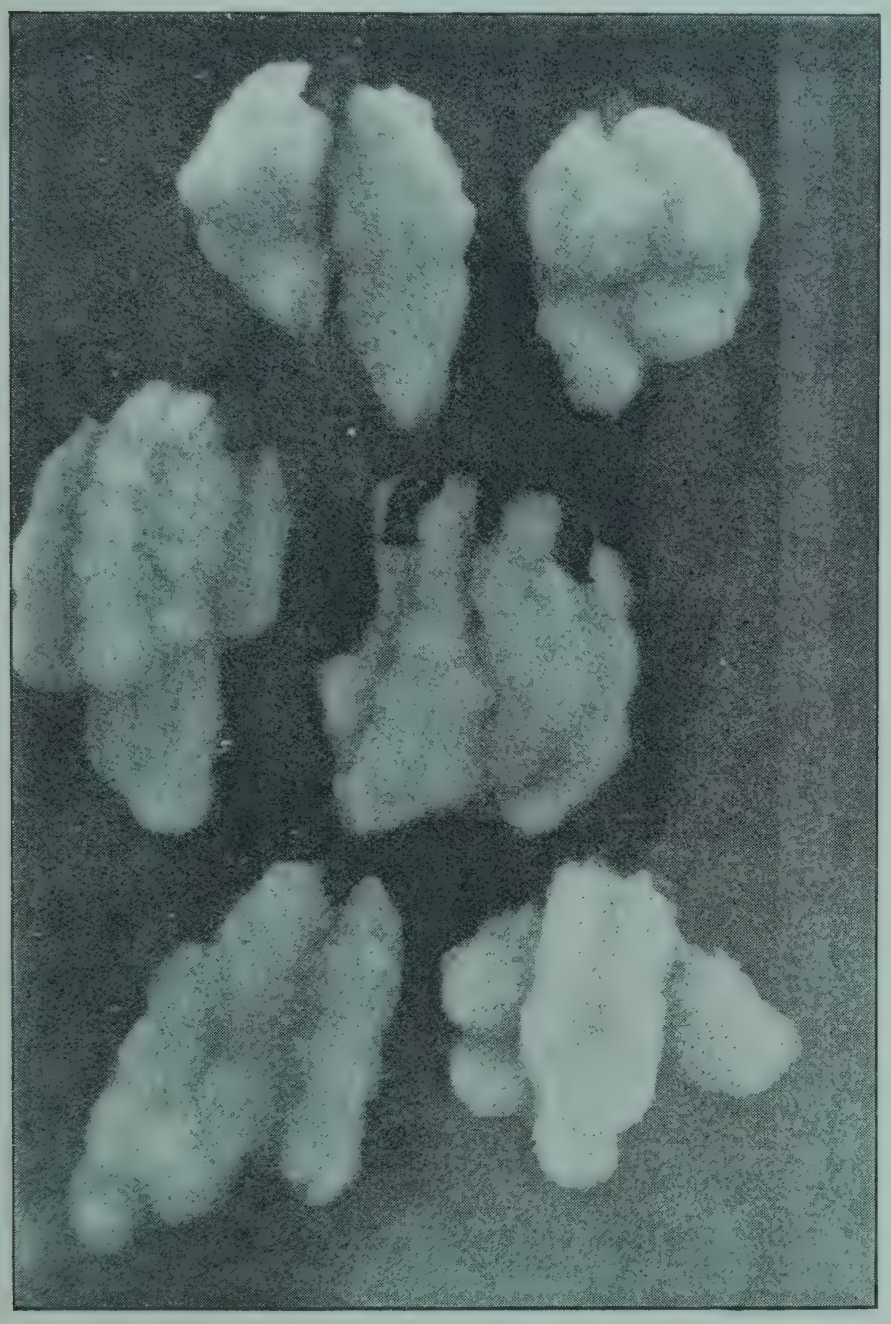
CROPS.

The principal annual crops grown were cotton, maize, and tobacco. Owing to the delay which occurred in commencing the clearing and ploughing operations, all of these were sown from six weeks to two months too late in the season. The yields obtained cannot, therefore, be accepted as a fair criterion of the probable yields from

[1] TROPICAL LIFE "Friend" in issue of June, 1908.

these crops when grown under more favourable conditions. Previous to planting, the land for each crop was thoroughly cleared of all roots and tree stumps, then hoe-ploughed and levelled.

The Superintendent's records and field notes in regard to each crop are given in schedule form in the appendix to this report, see pp. 127-36.



SIX WELL-EXPANDED BOLLS OF LONG STAPLE UPLAND COTTON, VARIETY "COOK."

Agricultural Experimental Station, Zimbiti, August, 1908.

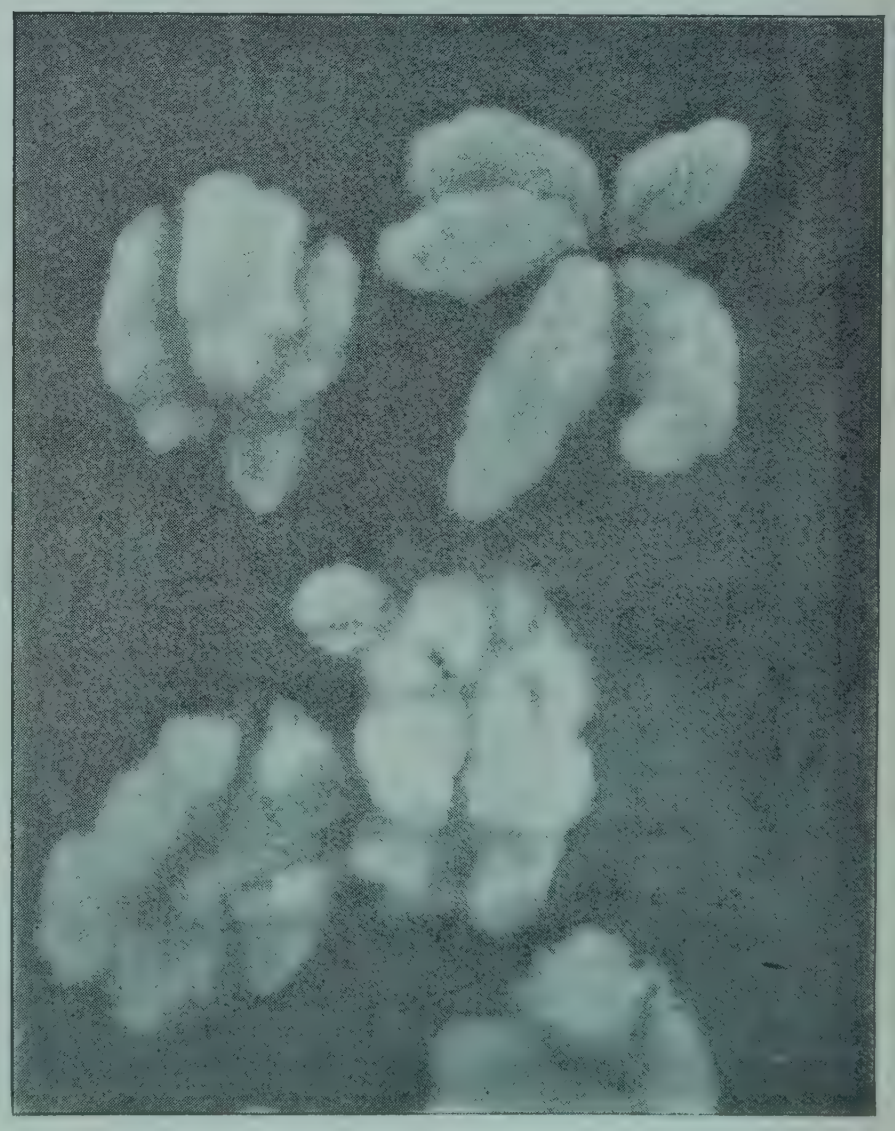
Cotton.—Twenty different varieties of cotton were tested, and the following tables furnish details in regard to the results obtained from each.

The Sea Island (Cherinda) plot measured $\frac{1}{25}$ hectare, the area of all others being $\frac{1}{8}$ hectare. Each plot was similarly treated in regard to weeding and harrowing.

All the plots were attacked by caterpillars and aphis, but these were promptly exterminated by sprayings of Paris green and kerosine emulsion respectively. Grasshoppers were troublesome to young plants, and stainers appeared in each plot as soon as the bolls matured. Vacancies were resown in each plot until a regular stand of plants was obtained.

The yields given in the following schedule still further corroborate the opinion expressed by the writer in previous reports in regard to the advisability of substituting upland varieties of cotton, and preferably the long staple types, for the Egyptian and Sea Island varieties formerly grown in this territory.

Description of variety	Yield of seed-cotton per hectare.	Yield of lint per hectare.	Percentage of lint to seed-cotton
Long Staple Upland—	Kilos.	Kilos.	
Allen's Long Staple ..	261·04	84·00	32·18
Allen's Hybrid	118·40	36·00	30·40
Allen (Cherinda)	472·80	152·80	32·32
Griffin U.S.A.	417·60	137·60	32·95
Griffin (Cherinda) ..	406·00	106·00	26·1
Cook	284·80	88·40	31·03
Commander	463·20	123·20	30·55
Southern Hope	309·36	100·8	32·58
Peeler	724·80	246·4	33·99
Bailey	725·60	240·00	33·07
Moon	483·20	160·00	33·11
Mitafiffi Egyptian ..	131·20	41·20	31·40
Jannovitch Egyptian ..	40·64	9·60	23·62
Abassi Egyptian	97·92	29·60	30·22
Sea Island (St. Kitts) ..	*Nil*		
Sea Island (Cherinda) ..	*Nil*		
Short Staple Upland—			
Bates' Big Boll	250·72	86·40	34·46
Bates' Favourite	244·80	80·00	32·67
Champion Cluster ..	532·40	168·00	31·55
King	635·20	224·00	35·26



FIVE WELL-EXPANDED BOLLS OF LONG STAPLE UPLAND COTTON, VARIETY "PEELER."

Agricultural Experimental Station, Zimbiti, August, 1908.

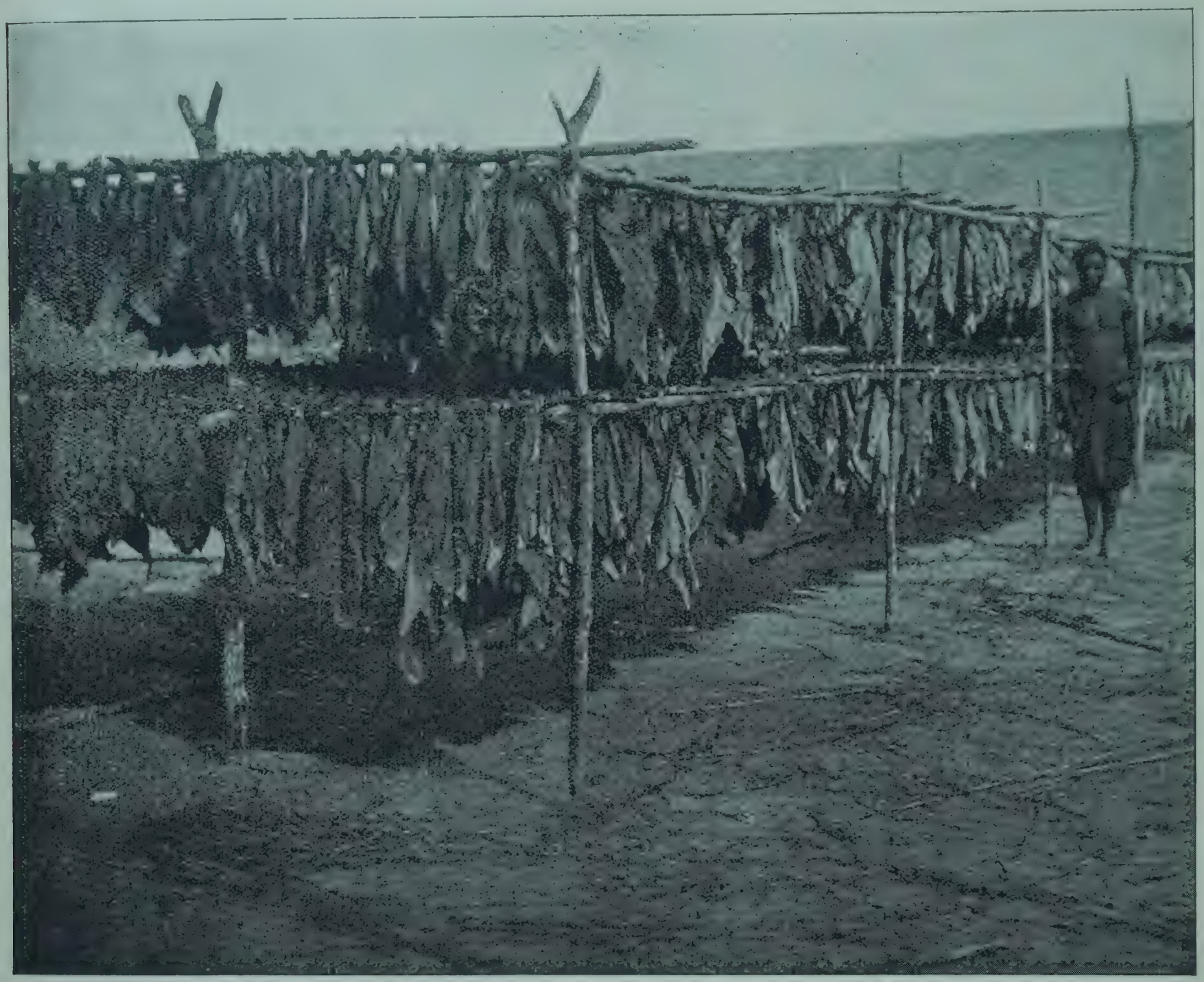
As it is considered that a yield of 200 kilos and 170 kilos. of lint per hectare of short staple and long staple upland cotton respectively is required to ensure a profit in this territory, it will be observed that, notwithstanding the disadvantages under which this cotton was grown,

these yields were exceeded in three different instances. The comparatively high percentage of lint to seed-cotton obtained from the long staple upland varieties is specially noteworthy. These varieties rarely yield more than 30 per cent. of lint to seed-cotton, yet this percentage was exceeded in every case, with one exception only. The length, strength, and colour of the lint of the various upland varieties compared very favourably with these characteristics of the lint prodnced by similar varieties in the Southern States of America. The lint of the Egyptian varieties was, however, decidedly inferior in each instance.

Maize.—Eleven different varieties of this crop were experimented with. Caterpillars and grasshoppers did a good deal of damage. The former were eventually checked by spraying with Paris green, but this remedy was not so effective with the grasshoppers. A stem-borer was exceedingly troublesome. As its attacks are principally confined to the interior tissues of the stem, applications of insecticides had little effect in checking its depredations.

The plots for this crop were prepared in a similar manner to those for cotton. The land in each plot was kept free of weeds and harrowed when necessary. Vacancies in each plot were re-sown.

The subjoined schedule shows the yield of dry grain per hectare of each variety; $\frac{1}{33}$ hectare was sown with the Hickory King variety, and $\frac{1}{16}$ hectare with each of the others.



TOBACCO TIED UP IN "HANDS" READY TO PUT INTO FLUE CURING BARN.
Agricultural Experimental Station, Zimbiti, August, 1908.

	Yield of grain per hectare
White Bango	1,968 kilos.
Chester County Mammoth	1,424 ,,
Golden King	1,376 ,,
Iowa Silver Mine	1,040 ,,
Hickory King	990 ,,
Early Star Leaming	656 ,,
Wisconsin White Dent	576 ,,
Champion White Pearl	496 ,,
Thorobred White Flint	241 ,,
Improved Early Horse-tooth	128 ,,
Extra Early Horse-tooth	112 ,,

This crop suffered considerably from being sown late, and satisfactory yields were only obtained from the first three varieties mentioned in the above schedule, 1,200

kilos. of maize per hectare being the average yield obtained in the different South African Colonies and Rhodesia.

Tobacco.—Seeds of thirty-two different varieties of tobacco were sown in the nurseries. Seedlings for planting out were successfully raised from twenty-seven varieties, and a plot was planted with each. Leaf fit for curing was produced on twenty-two plots. The total

Flue Curing Tobacco Barn.
Natives tying tobacco leaf into "hands."

area of the latter was 2·2375 hectares, from which 504 kilos. of cured leaf were obtained, an average of 225 kilos per hectare.

The yields of cured leaf per hectare from each of the twenty-two varieties is shown below:—

Variety	Yield of cured leaf per hectare
Long Leaf Gooch	464 kilos.
Yellow Mammoth	456 ,,
Sumatra imported	453 ,,
Kentucky Yellow	416 ,,
Gold Finder	320 ,,
Zimmers Spanish	312 ,,
Sweet Orinoco	272 ,,
Eastern Pride	252 ,,
Sumatra	248 ,,
White Stem Orinoco	240 ,,
Conqueror	224 ,,
Florida Sumatra	216 ,,
Smyrna	192 ,,
Warne	136 ,,
Lacks	104 ,,
Connecticut Seed Leaf	72 ,,
Sumatra	64 ,,
Vuelta Abajo	64 ,,
Honduras	56 ,,
Cuban Leaf	40 ,,
Gooch	40 ,,
White Burley	16 ,,

These yields are low when compared with those obtained in countries where tobacco is extensively cultivated, but it is only fair to point out that the seeds were sown at least two months late, and the plants consequently suffered considerably from drought. All the harvested leaf was flue-cured, and the leaf of each variety has been kept separate. The object aimed at in curing was to obtain "bright yellow leaf," for which there is such an enormous demand at the present time, and the results are very satisfactory. It is therefore considered that the reports of the experts, to whom samples are being submitted, will confirm my opinion, that tobacco leaf of really first-class quality can be produced in this territory.

Various.

Small plots of sunflower, ground-nuts, sesamum, and castor oil were also grown. The poor results obtained in each case were principally owing to late planting and lack of rain.

Rubber. — A plot measuring $\frac{1}{4}$ hectare was planted with young Ceará (*Manihot Glaziovii*, Muell. Arg.) trees transferred from the Chimoio Garden, and a second, measuring $\frac{1}{10}$ hectare, was sown with Ceará seeds with a view to compare the rate of growth of transplanted and untransplanted trees.

Seeds of the undermentioned rubber-producing trees were sown in the nurseries, and a large number of plants of each have been raised, *i.e.*, *Hevea brasiliensis*, Muell. Arg.; Para rubber; *Manihot Glaziovii*, Muell. Arg.; Ceará rubber; and *Mascarenhazia elastica*, K. Sch. var., Nharasika rubber.

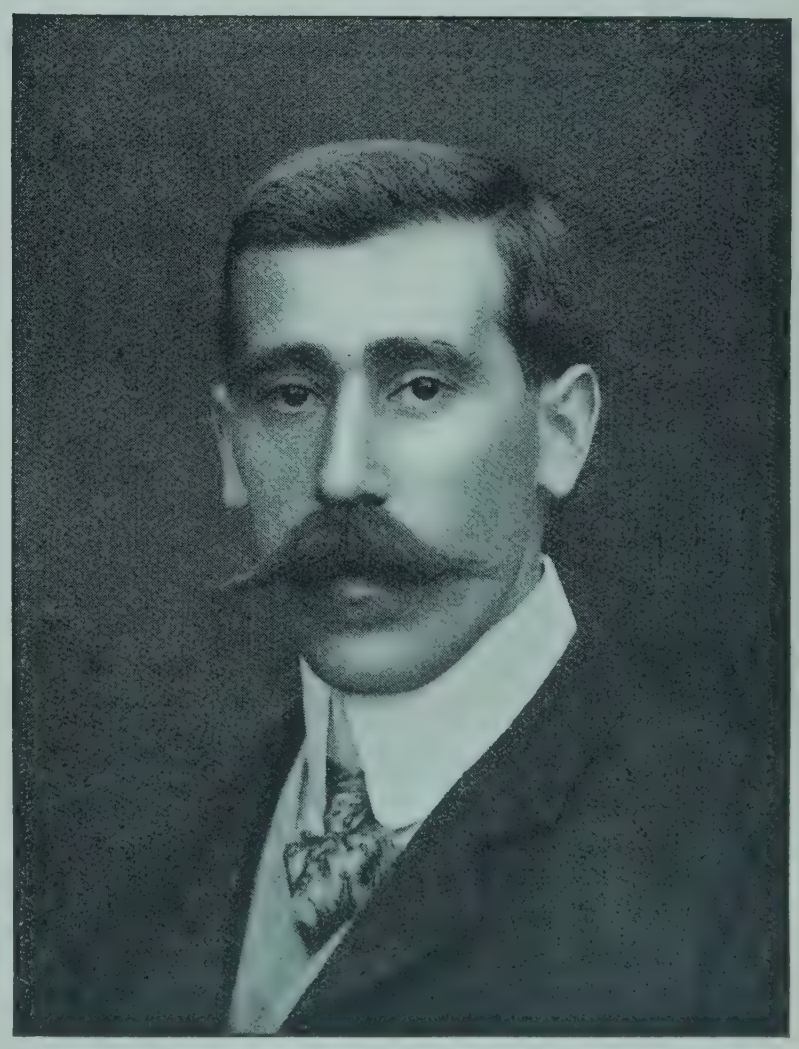


Photo by Elliott and Fry.]

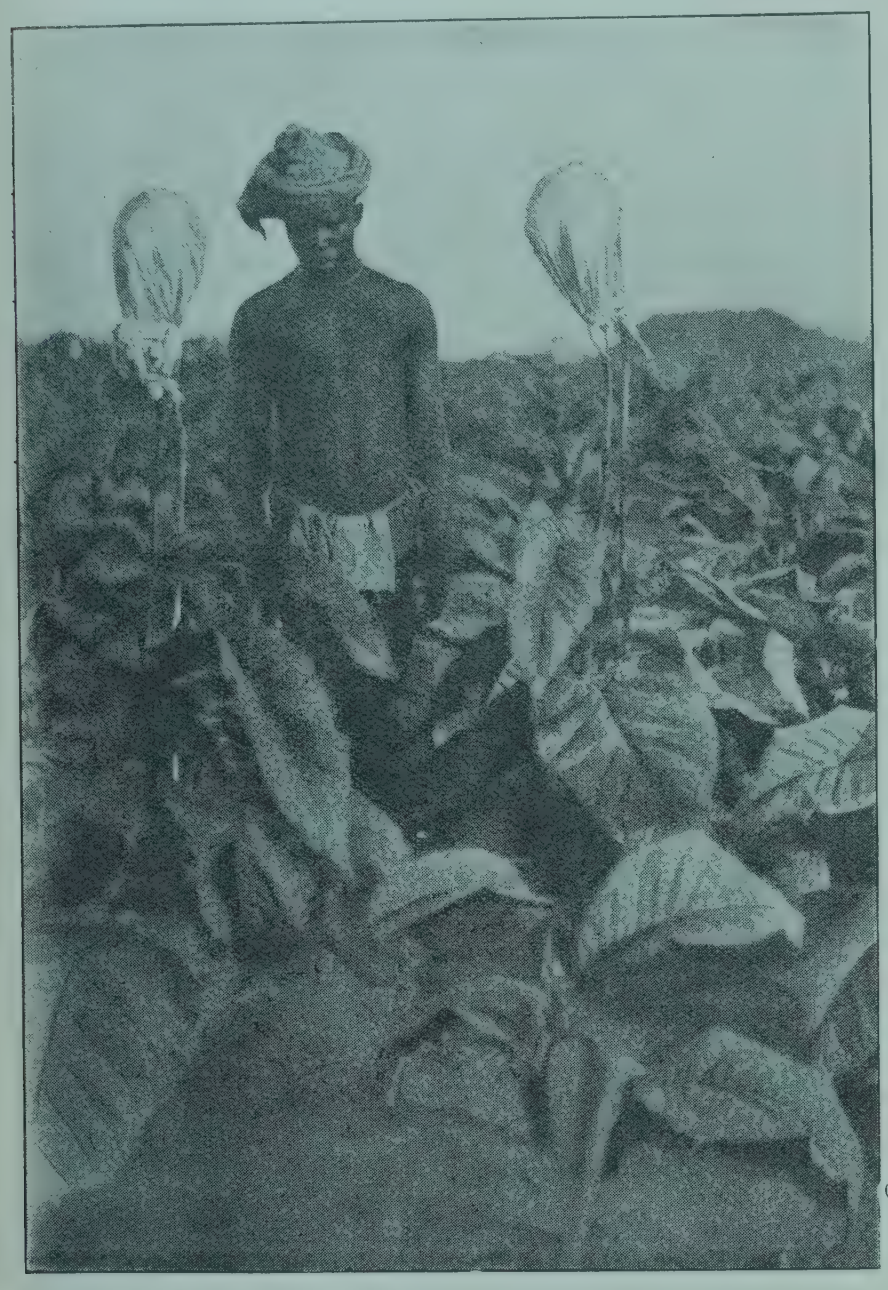
W. H. Johnson, F.L.S., &c.
Director of Agriculture of the Mozambique Company.

Pests.

Baboons and deer caused a deal of damage to the growing crops. The visits of the former were confined to the daytime, when a sharp look-out could be kept for

them, and although they found little to eat except maize, they destroyed numerous plants in what appeared to be mere playful curiosity. The deer, on the other hand, came constantly and browsed on the young succulent plants at night. A live hedge is being planted around the station which, when fully grown, should check these depredations.

Notwithstanding that all seeds were fumigated with carbon bisulphide and immersed in corrosive sublimate solution to destroy insect and fungus pests, the former were exceedingly prevalent in nearly every plot. With



SELECTED PLANTS OF KENTUCKY YELLOW TOBACCO WITH FLOWERS ENVELOPED IN NETTING TO PREVENT CROSS FERTILIZATION.

Zimbiti Agricultural Experimental Station, August, 1908.

the exception of the cotton stainers, maize stem borers, and grasshoppers, these were successfully exterminated by the various insecticides applied. The only fungus attack observed was a mould on tobacco seedlings in the nursery, and this was checked by dusting the affected areas with powdered sulphur.

WATER SUPPLY.

It is extremely satisfactory to note that although last dry season was one of the most protracted on record, there was always a good flow of water in the stream which runs through the Station. There will thus be little difficulty in arranging irrigation experiments should they be considered necessary. The nurseries have been made adjacent to the stream, and water is conveyed from it to the seed-beds by means of a small force pump and portable hose.

BUILDINGS.

The buildings attached to the Station consist of :—

(1) A dwelling-house and office with kitchen and servants' rooms for the superintendent, the first-mentioned being raised 2 metres above the ground on stout wooden piles, as shown in the photograph on p. 122. These buildings, together with a tool and seed store, were erected at a cost of £330 18s. 1d.

(2) The flue-curing tobacco barn shown in accompanying photograph was constructed at a cost of £78 16s. 4d.

(3) Native lines, on which a sum of £21 14s. 11d. was spent on materials.

(4) A temporary building of locally collected material has been erected for the superintendent's assistant, as well as a cattle shed and a large crop store. All the last-mentioned were built by the Station labourers and without any other cost to the Companhia.

SEED COLLECTION.

Special attention has been given to the selection of seeds from prolific, disease-resistant plants for next season's cultivation. In the case of tobacco, the most promising plants were selected, and their flowers protected, to prevent cross-fertilization by inferior varieties. It is proposed to sow the seeds from each plant separately in order to decide whether the type is fixed. Alongside of the plants raised from these seeds will be grown others raised from the seeds originally imported, with a view of demonstrating whether any particular variety has improved or deteriorated since its introduction. The seeds from selected cobs of each variety of maize will be likewise sown separately. Cotton seeds have been chosen from the most prolific plants, and from those which produced lint of the best quality and the greatest percentage of lint to seed.

For tables see following pages.

It is now possible to supplement the incomplete figures as to the trade of the Port of Beira and the territories administered by the Mozambique Company for the year 1908, which were recently published in the Colonial Office Report on the Trade and Commerce of the Province of Mozambique. The complete figures for 1908, as compared with the previous year, are shown in the following table :—

	1907.	1908
Imports	£260,040 ..	£354,420
Exports	124,740 ..	302,720
Re-exports	242,000 ..	251,680
Transshipments ..	398,860 ..	600,600
Transit	597,740 ..	664,620
Coasting	141,900 ..	165,220
Total	£1,765,280	£2,339,260

As will be seen, the increase in the movement of trade during 1908, as compared with the previous year, amounts to £573,980, or over 32 per cent. One of the most satisfactory features of the return is that the improvement is spread over the whole field, thus indicating that both the local trade in the territories administered by the Mozambique Company and the transit traffic with Rhodesia is improving. From the Customs returns for the first quarter of this year the improvement would seem to be not only maintained but increasing.

GROUND NUTS, &c.

Variety	Area planted	Seed sown. Kilos.	Date	Date of germination	Date of flowering	Date of fruiting	Date of harvesting	Preparation of land	Weight of crop. Kilos.	Insect pests	General remarks
Sample No. 8. Machanga (Ground-nuts)	3 rows of 25 m.	0·160	26/2/08	2/3/08	30/4/08	30/4/08	27/7/08	Partly cleared of stumps and roots, hoe-ploughed and surface levelled	0·720	Larvæ attacked plants June 13th	Seeds germinated poorly. Growth of plants much stunted, and seemed to require more rain in later growth. Larvæ attacked the foliage severely during the night, but remained under the surface of ground near the roots during day. Paris green spraying appeared to have little effect on the destruction of same
From Manga (Ground-nuts)	50 m. by 25 m.	—	29/2/08	6/3/08	30/4/08	30/4/08	30/7/08	,,	10	Larvæ attacked plants June 13th	Same remarks *re* larvæ as above. Seeds germinated very poorly, weather hot and dry, all vacancies resown March 26th. Germination better, light rain fell, growth of plants very poor and stunted, appeared to require much more rain
Mauricias ex Cherinda (Ground-nuts)	50 m. by 25 m.	—	14/3/08	21/3/08	—	—	—	,,	—	—	Seeds practically failed to germinate, only about six plants raised and these produced nothing. Seeds badly attacked by insects.
Indigena ex Cherinda (Ground-nuts)	50 m. by 25 m.	—	14/3/08	21/3/08	—	—	—	,,	—	—	Ditto ditto ditto
Feijão sample No. 4. Machanga	3 rows of 25 m.	0·200	26/2/08	6/3/08	—	—	5/8/08	,,	5	—	Seeds germinated very well and plants appeared healthy throughout the growth. No insect attacks as far as could be seen.
Clay Cow Pea ..	—	100 lb.	24/4/08 to 16/5/08	28/4/08	30/6/08	30/6/08	28/7/08	,,	—	—	Majority of seeds germinated well, especially those sown on damper soil. Plants appeared to require much more rain, the growth being greatly accelerated after rains. All the plots were severely attacked by buck, destroying a large quantity of plants and seed
Ricino, Cia. do Govuro, Sample No. 2 (Castor-oil)	25 m. by 15 m.	0·245	26/2/08	5/3/08	18/5/08	26/6/08	30/7/08 to 20/8/08	Cleared of all stumps and roots, hoe-ploughed and surface levelled	6	None	Seeds germinated well, a few transplanted grew very poorly and gave no fruit. Plants appeared to require more rain throughout the growth. The distance between the plants appeared rather insufficient for stronger growing plants. Self-sown plants on the plantations were of very much finer growth and bore very much more fruit than any on this plot; they were in most cases near the river
Girasol, Cherinda (Sunflower)	50 m. by 25 m.	—	2/3/08	6/3/08	21/4/08	30/4/08	29/5/08 to 30/6/08	,,	96	Larvæ appeared April 7th	Vacancies resown once, a few occurred only. Seeds germinated very well, plants thinned out to one in a stand. A few larvæ appeared, and those were picked off the plants; apparently no damage was caused. Growth of plants very irregular; many were of large size and gave a quantity of fruit, but the remainder very small, giving practically nothing. These latter were growing on patches of sodden soil during early stages of growth and did not appear to recover later on. Among the plants were several varieties. The distance between plants seemed rather far even for the larger plants, viz., 1 m. × 50 m.
Whip-poor-Will (Cow Pea)	—	100 lb.	1/6/08	6/6/08	—	—	—	,,	—	—	Practically all seeds badly attacked and eaten by insects; only a few germinated, grew very poorly, and were attacked badly by buck; no seeds have been gathered yet and plants are dying off in many places

Variety	Area planted	Seed sown. Kilos.	Date	Date of germination	Date of flowering	Date of fruiting	Date of harvesting	Preparation of land	Total weight of crop. Seed-cotton. Kilos.	Insect pests	General remarks
Allen Long Staple ..	50 m. by 25 m.	4	5/2/08	9/2/08	17/4/08	30/4/08	19/6/08 to 26/8/08	Cleared of all roots and stumps, and hoe-ploughed and surface levelled	32·630	Grasshoppers and larvæ first attacked plants March 7th; aphis, March 28th; cotton stainers, June 22nd	Vacancies resown twice. Insects were successfully destroyed by spraying with Paris green and kerosine emulsion. Cotton stainers could not be exterminated, although constant collecting and killing of same was carried out. Grasshoppers were very few on this plot.
Allens Hybrid ..	50 m. by 25 m.	2·40	4/2/08	9/2/08	14/4/08	23/4/08	19/6/08 to 26/8/08	,,	14·800	Grasshoppers and larvæ first attacked plants March 7th; aphis, March 28th; stainers, June 29	Vacancies resown three times. Larvæ were destroyed by spraying with Paris green, but grasshoppers were troublesome throughout early stages of growth. Aphis were destroyed. Stainers were not exterminated. Soil very wet, plants very poor, the majority bearing no fruit at all.
Griffin (U.S.A.) ..	50 m. by 25 m.	1·80	4/2/08	9/2/08	14/4/08	30/4/08	16/6/08 to 26/8/08	,,	52·200	Grasshoppers and larvæ first attacked plants March 7th; aphis, February 28th; stainers, June 16th	Vacancies resown twice. Larvæ destroyed with Paris green spray. Grasshoppers remained troublesome during early stages. Stainers were not completely exterminated. Plants very irregular in growth.
Mitaffifi (Egypt) ..	50 m. by 25 m.	1·40	4/2/08	9/2/08	17/4/08	30/4/08	29/6/08	,,	16·400	Aphis first attacked plants February 2nd; grasshoppers and larvæ, March 7th; stainers, June 29th	Vacancies resown three times. Larvæ destroyed by Paris green spray. Grasshoppers remained troublesome in early stages. Aphis destroyed by spraying with kerosine. Stainers not completely exterminated. Growth of plants poor, bolls very small; dry weather appeared to affect the growth very considerably.
Jannovitch (Egypt) ..	50 m. by 25 m.	2·0	4/2/08	9/2/08	30/4/08	6/5/08	10/7/08 to 10/8/08	,,	5·080	Larvæ and grasshoppers first attacked the plants March 11th; aphis, February 29th; stainers, July 10th	Vacancies resown three times. Larvæ successfully destroyed by spraying with Paris green. Grasshoppers troublesome during earlier stages of growth. Aphis destroyed with kerosine emulsion. Stainers not completely exterminated. Growth of plants tall, bare, very few bolls and small, lint very poor. Dry weather appeared to stop growth; bolls opened very badly, withered and hard. All plants destroyed August 12th as per instructions.
Abassi (Egypt) ..	50 m. by 25 m.	1·80	5/2/08	9/2/08	30/4/08	6/5/08	17/5/08 to 10/8/08	,,	12·240	Aphis firs attacked plants February 28th; grasshoppers and larvæ, March 7th; stainers, July 17th	Vacancies resown three times. Larvæ destroyed by spraying with Paris green. Grasshoppers troublesome throughout earlier stages of growth. Aphis successfully destroyed. Stainers not completely exterminated. Growth of plants poor and irregular, a large quantity bearing no flowers, bolls very small and withered, but very poor. Dry weather appeared to effect growth considerably. All plants destroyed as per instructions on August 12th.
Cook (U.S.A.) ..	50 m. by 25 m.	3·40	5/2/08	9/2/08	14/4/08	30/4/08	22/6/08 to 27/8/08	,,	35·650	Aphis first attacked plants February 29th; larvæ, March 6th; grasshoppers, March 6th; stainers, June 22nd	Vacancies resown twice. Larvæ were destroyed by spraying with Paris green. Grasshoppers remained very destructive earlier stages of growth. Aphis were destroyed successfully by kerosine. Stainers were not exterminated. Soil on plot remained very sodden for some weeks, and plants remained small. All plants destroyed September 1st.

Commander (U.S.A.)	50 m. by 25 m.	3·40	5/2/08	9/2/08	14/4/08	30/4/08	17/6/08 to 22/8/08	Ground cleared of all stumps and roots, and hoe-ploughed and surface levelled	50·400	Aphis appeared February 29th; larvæ and grasshoppers, February 29th; stainers, July 20th	Vacancies resown twice. Larvæ destroyed successfully by Paris green spraying, but grasshoppers caused a considerable amount of damage in early stages of growth, and were not totally exterminated. Aphis destroyed by kerosine spray. Stainers were not exterminated. Bolls opened well in most cases; lint easily extracted. Plants pulled up and burnt September 1st.
Sea Island, St. Kitts (Cherinda)	50 m. by 25 m.	3·0	5/2/08	12/2/08	21/4/08	30/4/08	—	,,	—	Aphis appeard first February 29th; larvæ on March 6th; grasshoppers, March 6th; stainers, June 30th	Vacancies resown three times. Larvæ destroyed by Paris green spray, but grasshoppers not exterminated, and caused a considerable amount of damage to young plants. Aphis destroyed by kerosine spray. Stainers not exterminated. Growths of plants very poor; in majority of cases bolls failed to open, and remained small and hard. A number of plants did not flower at all. No lint picked, and all plants destroyed August 14th.
Sea Island (Cherinda)	20 m. by 20 m.	2·0	7/2/08	12/2/08	21/4/08	30/4/08	—	,,	—	Aphis appeared first on February 29th; larvæ and grasshoppers, March 6th. No stainers appeared on plants	Vacancies resown three times. Larvæ destroyed by Paris green spray. Grasshoppers were not exterminated, and caused any amount of trouble in young plants. Growth of plants very poor, bolls practically failed to open, and remained small and hard. No lint gathered at all. All plants pulled up and burnt August 14th.
Allen (Cherinda) ..	50 m. by 25 m.	Uncertain, seed very bad. Soaked in water, and a quantity thrown away	6/2/08	10/2/08	14/4/08	21/4/08	27/6/08 to 3/9/08	,,	59·00	Aphis first appeared February 29th; larvæ and grasshoppers, March 10th; stainers, July 18th	Vacancies resown twice. Larvæ successfully destroyed by Paris green spray. Grasshoppers were not all exterminated, and caused a lot of damage to young plants. Aphis were destroyed by kerosine spray. Stainers were not all killed. The earlier bolls opened badly, and the lint difficult to pick; but later bolls were good, opened well, and lint easy to pick. A quantity of the largest plants bearing heavily, produced but little lint, the bolls drying up and not opening properly. All plants pulled up and burnt September 3rd.
Griffin (Cherinda) ..	50 m. by 25 m.	,,	6/2/08	10/2/08	14/4/08	21/4/08	22/6/08 to 1/9/08	,,	50·750	Aphis first appeared February 29th; larvæ and grasshoppers, March 9th; stainers, June 22nd	Vacancies resown three times. Larvæ destroyed by Paris green spray. Grasshoppers were not totally exterminated, and caused a lot of trouble to young plants. Aphis destroyed successfully with kerosine spray. Stainers were not totally exterminated. A large number of bolls failed to open properly, being dried up and hard, especially those towards the tops of plants. All plants pulled up and destroyed September 1st.
King (Cherinda) ..	50 m. by 25 m.	4·50	6/2/08	9/2/08	1/4/08	21/4/08	23/5/08 to 22/8/08	,,	79·400	Aphis first appeared February 29th; larvæ and grasshoppers, March 10th; stainers, June 10th	Vacancies resown twice. Larvæ destroyed by Paris green. Grasshoppers not all killed, and caused an amount of damage to young plants. All aphis killed with kerosine. Stainers not all killed. The first variety with ripe bolls, plants small. All plants pulled up and burnt August 22nd.
Moon (U.S.A.) ..	50 m. by 25 m.	2·40	7/2/08	11/2/08	14/4/08	21/4/08	15/6/08 to 22/8/08	,,	60·400	Aphis first appeared February 29th; grasshoppers, March 5th; larvæ, March 10th; stainers, June 15th	Vacancies resown twice. Larvæ were successfully killed by Paris green spray. Grasshoppers were not all killed, and caused considerable damage to young plants. Aphis destroyed by kerosine spraying. Stainers were not all exterminated. A quantity of plants with small, hard bolls which failed to open, especially on the higher branches. Cotton easily extracted. All plants pulled up and burnt August 22nd.

COTTON—*(continued)*.

Variety	Area planted	Seed sown. Kilos.	Date	Date of germination	Date of flowering	Date of fruiting	Date of harvesting	Preparation of land	Total weight of crop. Seed-cotton. Kilos.	Insect pests	General remarks
Bailey (U.S.A.) ..	50 m. by 25 m.	2·40	7/2/08	11/2/08	14/4/08	21/4/08	20/6/08 to 21/8/08	Ground cleared of all stumps and roots, and hoe-ploughed and surface levelled	90·710	Aphis appeared February 29th; larvæ and grasshoppers, March 10th; stainers, July 3rd	Vacancies resown twice. Larvæ effectively killed with Paris green spraying. Aphis destroyed by kerosine spray. Grasshoppers were not all exterminated, and continued doing harm during early growth. Stainers were not all killed. A large quantity of bolls opened very badly and appeared to dry up; this variety was the most difficult to gather. All plants pulled up and burnt August 21.
Southern Hope (U.S.A.) ..	50 m. by 25 m.	2·20	7/2/08	11/2/08	14/4/08	30/4/08	17/6/08 to 27/8/08	,,	38·670	Larvæ first appeared February 26th; aphis, February 28th; grasshoppers, February 24th; stainers, August 4th	Vacancies resown twice. Larvæ killed by Paris green spray successfully. Grasshoppers caused very little damage. Aphis all exterminated by kerosine spray. Stainers not all killed. Ground very damp and sloping, and very irregular. Majority of vacancies caused by washing out by heavy rains. Cotton easily picked. All plants destroyed September 1st.
Bates' Bigg Boll (U.S.A.) ..	50 m. by 25 m.	1·40	17/2/08	22/2/08	14/4/08	30/4/08	22/6/08 to 25/8/08	,,	31·340	Aphis first appeared March 5th; larvæ, and grasshoppers, March 10th; stainers, June 30th	Vacancies resown twice. Larvæ killed by Paris green spray. Aphis destroyed by kerosine spray. Grasshoppers were not totally destroyed, and did a lot of damage to young plants. Stainers were not all destroyed. Plot very irregular, river running through centre, and ground very sloping. Bolls in most cases opened well, and cotton very easily gathered. All plants pulled up and burnt August 26th.
Bates' Favourite (U.S.A.) ..	50 m. by 25 m.	1·40	17/2/08	22/2/08	14/4/08	30/4/08	10/7/08 to 25/8/08	,,	30·600	Aphis first attacked March 5th; larvæ, and grasshoppers, March 10th; stainers, July 28th	Vacancies resown twice. Larvæ killed by Paris green spray. Grasshoppers very bad during early stages of growth, and were not all exterminated. Aphis destroyed by kerosine spraying. Stainers were not all got rid of. Plot irregular and soil poor, a quantity of vacancies caused by heavy rains washing out seedlings. A quantity of bolls failed to open, and dried up. Cotton easily gathered. All plants pulled up and burnt August 25th.
Champion Cluster (U.S.A.) ..	50 m. by 25 m.	2·40	17/2/08	22/2/08	14/4/08	30/4/08	29/6/08 to 1/9/08	,,	66·550	Aphis first appeared March 5th; larvæ, and grasshoppers, March 18th; stainers, July 14th	Vacancies resown twice. Larvæ killed by Paris green spraying. Grasshoppers were not all killed, but caused very little damage on this plot. Aphis were killed by kerosine spraying. Stainers were not all destroyed. A large quantity of plants failed to flower, and many bolls opened badly; soil heavy and wet. Cotton easily picked. All plants pulled up and burnt September 1st.
Peeler (U.S.A.) ..	50 m. by 25 m.	2·40	18/2/08	22/2/08	14/4/08	30/4/08	22/6/08 to 1/9/08	,,	90·600	Aphis first appeared March 5th; larvæ, and grasshoppers, March 10th; stainers, August 1st	Vacancies resown twice. Larvæ and grasshoppers caused little damage on this plot. The larvæ were all killed by Paris green spray, but not all grasshoppers. Aphis killed by kerosine spray. Stainers not all exterminated. Cotton very easily picked. All plants pulled up and burnt September 1st.

The stands throughout the crop were good, the vacancies caused were in the majority of cases through heavy rains just after sowing, specially so on sloping land. Larvæ caused very little trouble throughout the crop, but grasshoppers were exceedingly troublesome to the young plants and also afterwards. Without exception, the plants growing round the base of anthills were very much larger than any of the others, but the result in fruit and cotton was the worst, practically all the bolls failing to open or only partly so. Stainers were also more troublesome on these plants. These insects were kept under to a great extent by constant collecting into cans of hot water, but they still continued to breed on the plants and were not exterminated. Aphides were in most cases killed by one application of kerosine; in a few cases only was it necessary to spray a second time. The crop seemed, generally, to require more rain towards the later stages of growth, during the growth of fruit, as, although the dew in April and June is heavy, it appeared insufficient for the crop.

Variety	Area planted	Seed sown	Date	Date of germination	Date of flowering	Date of fruiting	Date of harvesting	Preparation of land	Total weight of crop. Kilos. on cobs	Insect pests	General remarks
Wisconsin White Dent (Pretoria)	25 m. by 25 m.	1 lb.	10/2/08	15/2/08	14/4/08	23/4/08	25/5/08 to 9/6/08	Cleared of all stumps and roots, hoe-ploughed and surface levelled	47	Grasshoppers first appeared February 20th; larvæ, February 28th	Seeds germinated well, a few seedlings, washed out by heavy rains, replanted. Grasshoppers did considerable damage to seedlings, and were not all exterminated by spraying with Paris green. Larvæ attacked young plants severely but were checked by Paris green spraying, except a species which fed in the interior of main stem; this larva killed a quantity of plants. Soil heavy and wet. Growth poor.
Champion White Pearl (Pretoria)	25 m. by 25 m.	1 lb.	10/2/08	15/2/08	14/4/08	21/4/08	25/5/08 to 9/6/08	,,	41·400	Grasshoppers first appeared February 20th; larvæ, February 28th	Seeds germinated very well, practically no vacancies. Grasshoppers attacked seedlings severely and could not be checked by Paris green spraying. Larvæ were destroyed in most instances, except those attacking interior of plants. Soil very sodden and sloping. Growth poor and very irregular.
Chester County Mammoth (Pretoria)	25 m. by 25 m.	1 lb.	11/2/08	16/2/08	14/4/08	30/4/08	25/5/08 to 9/6/08	,,	113·400	Grasshoppers first appeared February 20th; larvæ, February 28th	Seeds germinated well, very few vacancies. Larvæ attacked plants severely but were checked by spraying with Paris green, except those feeding inside stems. Grasshoppers were not troublesome on this plot. Growth fairly regular.
Thorobred White Flint (Pretoria)	25 m. by 25 m.	1 lb.	21/2/08	26/2/08	14/4/08	15/5/08	19/6/08	,,	60	Grasshoppers first appeared February 29th; larvæ, March 10th	Seeds germinated irregularly and vacancies resown as far as possible with remainder of seeds. Grasshoppers not troublesome on this plot. Larvæ attacked young plants severely, and were partly destroyed by Paris green spraying, except those feeding inside stems. Plot with hollow centre and very wet, where plants failed to grow; growth of others irregular, many bearing no fruit.
Iowa Silver Mine (Pretoria) ..	25 m. by 25 m.	1 lb.	21/2/08	26/2/08	15/4/08	15/5/08	19/6/08	,,	89	Larvæ first appeared February 29th; also grasshoppers	Vacancies resown once. Spraying with Paris green for larvæ and grasshoppers not satisfactory in all cases, especially for larvæ feeding inside stems. Plot hollow and wet, a number of plants failing to grow, many plants bearing no fruit.
White Bango (Pretoria) ..	25 m. by 25 m.	1 lb.	21/2/08	26/2/08	14/4/08	15/5/08	22/6/08	Partly cleared of stumps and roots, hoe-ploughed and surface levelled	129	Larvæ and grasshoppers first appeared February 29th	Vacancies resown once. First sowing of seeds germinated poorly; vacancies resown were much better. Spraying with Paris green proved effective in some instances, but not all; grasshoppers very bad during early growth. A number of plants have no fruit. Stands good.
Early Star Leaning (Pretoria)	25 m. by 25 m.	¾ lb.	22/2/08	27/2/08	14/4/08	24/4/08	22/6/08	,,	56·800	Larvæ and grasshoppers first appeared February 29th	Vacancies resown once. Soil heavy and wet, many plants failed to bear fruit. Paris green spraying not very effective on larvæ and less so on grasshoppers.
Improved Early Horsetooth (Pretoria)	25 m. by 25 m.	1 lb.	21/2/08	26/2/08	14/4/08	1/5/08	22/6/08	,,	13	Larvæ and grasshoppers first appeared February 29th	Vacancies resown once. Germination very poor, and growth of plants very poor; very little fruit, the majority of plants failed to bear. Grasshoppers very destructive in early stages and not killed by Paris green altogether, spray for larvæ effective, except those feeding inside stems.
Hickory King (Pretoria) ..	25 m. by 12 m.	1 lb.	24/2/08	3/3/08	14/4/08	30/5/08	10/7/08	,,	44	Larvæ and grasshoppers first appeared March 10th	Larvæ destroyed by Paris green spray in most instances. Grasshoppers were not all killed and did considerable damage to young plants. Growth of plants poor and a quantity failed to bear fruit.

Variety	Area planted	Seed sown	Date	Date of germination	Date of flowering	Date of fruiting	Date of harvesting	Preparation of land	Insect pests	General remarks
Yellow Mammoth .. (U.S.A.)	50 m. by 20 m.	10 gr.	20/2/08	27/2/08	3/7/08	20/7/08	18/8/08 28/9/08	Ground cleared of all stumps and roots, and hoe-ploughed and surface levelled	Grasshoppers first attacked plants May 9th; larvæ, June 18th	Seeds germinated well and thickly, no insects. Larvæ caused little trouble, grasshoppers very troublesome. Growth of plants in most cases good. Several plants develop tiny white spots on leaves, plants sprayed with kerosine with apparently little effect; the white spots eventually turned brown. Vacancies refilled once. Seedlings planted out April 21st, 27th, and 28th, May 4th and 11th.
Havana (Rhodesia)	—	10 gr.	29/2/08	7/3/08	—	—	—	—	—	Practically failed to germinate, nothing worth transplanting.
Sumatra (Rhodesia)	25 m. by 25 m.	10 gr.	29/2/08	8/3/08	18/7/08	22/7/08	5/9/08 16/9/08	Ground cleared of all stumps and roots, and hoe-ploughed and surface levelled	Seed bed, none; grasshoppers first appeared June 5th; larvæ, June 18th	Seeds germinated poorly, and grew slowly and weak. Growth of plants poor and irregular, very weak; a few good plants only suffered badly for want of rain in latter growth. Larvæ totally destroyed by Paris green spray, which caused little trouble; grasshoppers not all destroyed. Seedlings planted on April 25th and March 13th.
Cuban Leaf .. .. (Rhodesia)	50 m. by 25 m.	10 gr.	12/3/08	21/3/08	—	—	16/9/08	,,	Seed bed, none; grasshoppers first appeared June 5th; also larvæ	Seeds germinated well, but grew slowly and appeared weak, although improving later. Larvæ did very little damage; grasshoppers destructive to young plants and not all exterminated. Growth of plants very poor throughout; soil heavy and very sodden during early growth, which the plants did not get over. Larvæ transplanted on April 25th, May 4th, and 13th.
Lacks (Rhodesia) ..	50 m. by 25 m.	10 gr.	12/3/08	21/3/08	31/7/08	—	16/9/08 28/9/08	,,	Seed bed, none; larvæ first appeared June 19th	Seeds germinated very well, and grew into strong, healthy plants, but after transplanting failed to grow to any size; weather very dry and soil sandy, very few plants of good growth. Larvæ did very little damage, and practically no grasshoppers appeared on the plot. Vacancies retransplanted once. Seedlings transplanted on March 6th and 11th.
Zimmer's Spanish .. (Rhodesia)	50 m. by 25 m.	10 gr.	29/2/08	7/3/08	3/7/08	20/7/08	13/8/08 5/9/08 28/9/08	,,	Seed bed, none; grasshoppers first appeared June 5th; larvæ, June 18th	Seeds germinated very well. Larvæ were of little trouble on plants in the field, and successfully destroyed by Paris green spray. Grasshoppers were not all exterminated, and caused much trouble to young plants. Growth of plants very patchy, a few large, others medium, the remainder very weak and small, after rain falling plants improved greatly, but growth appeared to stop as soon as soil dried up. The distance between the large plants appeared to be insufficient, viz., 75 cm. by 75 cm. Seedlings transplanted April 24th and 30th, May 7th, 11th, 15th and 16th.
Connecticut Seed Leaf (Rhodesia)	50 m. by 25 m.	10 gr.	29/2/08	7/3/08	8/7/08	14/7/08	28/8/08 16/9/08	,,	Seed bed, none; larvæ and grasshoppers first appeared June 18th	Seeds germinated well. Larvæ and grasshoppers not troublesome to any extent, the former killed by Paris green spray. Growth of plants very irregular; soil poor and wet during early stages of growth; a few plants near anthill very large; space between plants appeared insufficient, viz., 75 cm. by 75 cm. Vacancies replanted once. Seedlings transplanted on April 27th and 28th, May 5th and 12th.
Eastern Pride .. (U.S.A.)	50 m. by 25 m.	10 gr.	27/2/08	5/3/08	3/7/08	18/7/08	28/8/08 16/9/08 28/9/08	,,	Seed bed, none; grasshoppers first appeared June 5th; larvæ, June 19th	Seeds germinated very poorly at first, but improved later; seedlings strong and healthy. Larvæ not very troublesome, and all killed by Paris green spraying. Grasshoppers caused trouble to young plants and were not all exterminated. Growth of plants fair and regular, later transplanted suffered for want of rain. Vacancies transplanted, not any. Seedlings transplanted on April 29th, May 7th, 12th and 18th.

Honduras (Rhodesia)	50 m. by 25 m.	10 gr.	27/2/08	5/3/08	—	—	28/9 08	Ground cleared of all stumps and roots, and hoe-ploughed and surface levelled	Seed bed, none; grasshoppers first appeared June 5th; larvæ, June 19th	Seeds germinated slowly at first, but improved later. Larvæ successfully destroyed by Paris green. Grasshoppers not all exterminated and caused a deal of trouble in earlier stages of growth. Growth of plants very irregular, appeared to suffer for want of rain. Seedlings transplanted on May 8th, 15th and 20th.
Sumatra Imported (U.S.A.)	50 m. by 25 m.	10 gr.	27/2/08	7/3/08	—	—	18/8/08 28/8/08 5/9/08	,,	Seed bed, none; grasshoppers first appeared May 9th; larvæ, June 11th	Seeds germinated well; seedlings rather weak, appeared to require more light. Growth of plants irregular and many very poor; a number of plants with white spots on lower leaves; plants weak and lanky generally. Vacancies retransplanted twice. Seedlings transplanted on April 6th, 7th, 15th, 20th and 22nd.
Conqueror (Rhodesia)	50 m. by 25 m.	10 gr.	22/2/08	29/2/08	3/7/08	14/7/08	18/8/08 28/8/08 16/9/08	,,	Seed bed, none; larvæ and grasshoppers first appeared June 19th	Seeds germinated well and thickly. Larvæ killed by Paris green spraying. Grasshoppers not all exterminated. Growth of plants very slow in most cases, a few grew well and became fine plants; the last lot transplanted practically remained stationary, apparently for want of rain. Vacancies replanted once. Seedlings transplanted on April 31st, May 7th and 12th.
Goldfinder (Rhodesia)	50 m. by 25 m.	10 gr.	27/2/08	5/3/08	3/7/08	20/7/08	28/8/08 16/9/08 28/9/08	,,	Seed bed, none; larvæ and grasshoppers first appeared June 5th	A few patches attacked by fungus; dusting with sulphur stopped further spreading. Larvæ destroyed by Paris green spraying. Grasshoppers not all exterminated. Growth of plants rather small but very regular, appeared to require more rain. Seeds germinated well and very thickly. Vacancies replanted twice. Seedlings planted on April 18th and 23rd, May 4th.
Long Leaf Gooch (U.S.A.)	50 m. by 25 m.	10 gr.	27/2/08	5/3/08	3/7/08	20/7 08	13/8/08 18/8/08 28/8/08	,,	Seed bed, none; larvæ and grasshoppers first appeared June 5th	Neither larvæ nor grasshoppers were very troublesome on this plot; the former were successfully destroyed by Paris green spraying, but not the latter. Seeds germinated well. One of the best and most regular in growth of all varieties; a number of the last lot of transplants appeared to require more rain. Vacancies replanted once. Seedlings transplanted on April 22nd and 27th, May 2nd and 6th.
Smyrna (Rhodesia) ..	25 m. by 25 m.	10 gr.	12/3/08	21/3/08	3/7/08	—	19/8/08 5/9/08 16/9/08	,,	Seed bed, none; grasshoppers first appeared June 5th; also larvæ	Seeds germinated well, but grew very slowly and appeared weak and sickly, but improved later. Larvæ were troublesome throughout the growth in the field, but on each occasion destroyed by Paris green spray. Grasshoppers caused little trouble but were not all killed. Growth of plants irregular, in patches; growth slow during early stages for want of rain, and in later stages many plants appeared to dry up. Vacancies replanted once. Seedlings transplanted on May 1st, 7th and 11th.
Kentucky T. 19 .. (Experiment A)	25 m. by 25 m.	¼ oz.	7/1/08	14/1/08	—	—	—	,,	Seed bed, none; larvæ and grasshoppers first appeared June 19th	Seeds germinated fairly well. Larvæ not very troublesome and killed by Paris green spray; grasshoppers not all exterminated. Growth very poor and irregular, plants appeared to be mixed in variety and very sickly. Nothing picked for curing. Vacancies replanted twice. Seedlings planted on March 14th.
Sumatra T. 22 .. (Experiment C)	25 m. by 25 m.	¼ oz.	17/1/08	26/1/08	—	—	—	,,	Seed bed attacked by larvæ on March 10th; grasshoppers first appeared June 18th	Fungus growth attacked seed-bed in patches, and was checked by dusting with sulphur. Larvæ destroyed by Paris green spray; grasshoppers not all exterminated. Growth of plants very poor and appeared to be mixed. Seedlings planted on May 12th.
Connecticut T. 17 .. (Experiment E)	50 m. by 25 m.	¼ oz.	27/1/08	5/2/08	—	—	—	,,	Seed bed attacked by larvæ on April 4th; grasshoppers and larvæ first appeared June 19th	Seeds germinated very well and thickly. Larvæ destroyed successfully by Paris green spray; grasshoppers not all exterminated. Growth of plants exceedingly poor and very mixed in variety of shape of plants. Nothing picked for curing. Seedlings transplanted on May 12th and 25th.

Variety	Area planted	Seed sown	Date	Date of germination	Date of flowering	Date of fruiting	Date of harvesting	Preparation of land	Insect pests	General remarks
Kentucky T. 19 (Experiment F) ..	25 m. by 25 m.	¼ oz.	3/2/08	13/2/08	—	—	—	Ground cleared of all stumps and roots, and hoe-ploughed and surface levelled	Seed bed, none; larvæ and grasshoppers first appeared June 5th	Seeds germinated very well and appeared to be quite healthy. Larvæ caused little trouble and were killed by Paris green spray; grasshoppers were very destructive and not all exterminated, Growth of plants exceedingly poor from start to finish, and mixed. Nothing picked for curing. Seedlings transplanted on April 16th, 21st and 28th, May 6th.
Havana T. 18 (Experiment G) ..	25 m. by 25 m.	¼ oz.	8/2/08	15/2/08	—	—	—	,,	Seed bed, none; larvæ first appeared June 17th	Seeds germinated well and appeared quite strong and healthy at first, but grew weak and lanky, probably owing to the heavy covering. Growth of plants very poor and sickly, soil heavy and sodden when planted. Larvæ destroyed by Paris green spray. Nothing picked for curing. Seedlings planted on May 6th and 23rd.
Sumatra T. 22 (Experiment H) ..	25 m. by 10 m.	¼ oz.	13/2/08	20/2/08	3/7/08	—	—	,	Seed bed attacked by larvæ; grasshoppers and larvæ first appeared June 5th	Seeds germinated well, small patches died off, due to fungus disease (?), and dusted with sulphur, which checked further spreading. Larvæ destroyed by Paris green spray. Growth of plants irregular and generally poor, a few plants of fair size and good shape, growth very similar to "Zimmer's Spanish." A few leaves cut for curing. Seedlings transplanted on April 25th, May 11th and 19th. Plants appeared to suffer in earlier growth for want of rain.
Kentucky T. 19 (Experiment M) ..	50 m. by 25 m.	¼ oz.	21/3/08	28/3/08	—	—	—	,,	Seed bed, none; larvæ and grasshoppers first appeared June 19th	Seeds germinated well, and seedlings were strong and healthy, but made no progress after transplanting; weather dry and hot; practically no plants grew to any size, nothing picked for curing. Transplanted on May 14th, 16th and 25th.
Experiments B, D, I, J, K, L, N	—	—	—	—	—	—	—	—	—	Nothing transplanted, seedlings too weak.

Where seeds germinated well they were much too thick, and had to be constantly thinned out. All transplants covered with dry grass until well rooted. Seed beds appeared to be too heavily shaded, the growth of seedlings being in most cases weak. All plants constantly kept free from shoots and suckers, and topped. Grasshoppers caused a considerable amount of damage to young plants, and Paris green spraying in no cases killed them all off. Plants throughout the crop appeared to require much more rain.

SESAMUM.

Variety	Area planted	Seed sown	Date	Date of germination	Date of flowering	Date of fruiting	Date of harvesting	Preparation of land	Weight of crop. Kilogrammes	Insect pests	General remarks
Sample No. 5. Sofala	25 m. by 25 m.	0·225	27/2/08	4/3/08	13/4/08	16/5/08	3/7/08	Cleared of all stumps and roots, hoe-ploughed and surface levelled	19	Larvæ first attacked plants March 16th	Larvæ were completely destroyed by spraying with Paris green. Grasshoppers did not attack plants at all, although present on the plot. Seeds germinated very well and were thinned out to one in a stand 20 cm. apart x 50 cm. between rows; as they appeared to be too close and were growing lanky, every alternate plant was taken away on April 13th. The plants, however, after full growth, appeared to be too close. The seeds were mixed in colour.
White seeds. Sofala	25 m. by 25 m.	—	27/3/08	7/4/08	16/6/08	25/6/08	17/8/08	,,	—	Larvæ first appeared May 16th; aphis appeared on June 16th	Larvæ were all destroyed by spraying with Paris green. Grasshoppers did not attack plants. Germination very poor, only about a dozen plants raised, seed gathered was mixed in colour. Aphis quite destroyed by kerosine spraying.
Black seeds. Sofala	25 m. by 25 m.	—	27/3/08	7/4/08	16/6/08	30/6/08	12/8/08	,,	—	Larvæ appeared May 16th; aphis, June 16th	Larvæ destroyed by spraying with Paris green. Aphis destroyed by spraying with with kerosine. Germination of seed very poor; very dry weather after sowing, growth of the few plants raised poor and little seed. Seed mixed in colour. Neither larvæ nor aphis appeared to do much damage to the plants; they were, however, both exterminated as soon as discovered.

The India-rubber Market.

By Messrs. S. Figgis and Co.

Fine hard touched 8s. 4½d.; Plantation 8s. 6¼d.

The raw rubber market was continuously excited up to August 6th, and up to that date prices since our last continued to steadily mount up. Previous to the sales of July 23rd fine hard was selling up to 7s. 11d. for spot, and sellers were offering January—February delivery at 6s. 8½d. Soft fine realized 7s. 4½d.; scrappy negrohead was held for 5s.; Castilloa was 2d. to 3d. higher at 4s. 8d. to 4s. 9d. At the sales Plantations sold as follows:—

Malay.—Sheet, fair to fine, 8s. 2d. to 8s. 3d.; mixed inferior, 7s. 3d. to 7s. 11d. Crêpe, good to fine pale, 8s. 1d. to 8s. 3½d.; fair to good palish, 7s. 11d. to 8s. 1d.; light brown and grey, 7s. 2d. to 7s. 9d.; clean brown, part dark 6s. 2d. to 6s. 10d.; dark brown, part specky, 5s. 6d. to 6s.; black and soft, 5s. 1d. to 5s. 3¾d. Scrap and virgin pieces, fair to fine, 5s. 10d. to 6s. 7d.; mixed, part inferior, 4s. 10d. to 5s. 4d.

Ceylon.—Biscuit and sheet, fair to fine, 8s. 2d. to 8s. 3¼d. Crêpe, fair palish, 7s. 10d. to 7s. 11½d.; clean brown, 7s. 2d.; dark brown, 6s. to 6s. 6d. Scrap, fair to fine, 6s.

Later, fine mollendo sold at 7s. 3d. Malay smoked sheet realized up to 8s. 6¼d., and fine pale Crêpe up to 8s. 4¼d.

Central American.—Scrap sold at 4s.

Colombian.—Middling scrap, 3s. 11d. to 4s. 0½d.

Lamu Ball realised 4s. to 4s. 4s. 2½d.

Uganda.—Pears sold at 4s.

Abyssinian.—Sheet, 3s. 11½d. to 4s. 3½d.

The end of July found the market still advancing and price again higher. Sales included:—

Plantation.—Sheet, 8s. 4½d.

Hard Fine. — August—September delivery up to 8s. 4½d.; September—October up to 8s.; October—November up to 7s. 6½d.; November—December, up to 7s. 3½d.

Soft Fine.—Sales of near up to 7s. 10d.

Negrohead.—Manaos, scrappy value, about 5s. Cametas, buyers at 3s. 9d. Island, nominal, 3s. 3d.

Caucho Ball. — August—September delivery up to 4s. 9¼d. September—October, at 4s. 10¼d.

At Antwerp, on July 29th, about 330 tons of the usual Congo descriptions sold at an average advance over the previous auctions of fully 10 per cent.

The wild excitement of the preceding weeks was followed by a reaction at the sales on August 6th, which showed a decline in above prices.

Hard Fine.—On the spot being very scarce had been sold in retail lots privately, up to 8s. 6d., but to-day at only 8s., and forward delivery is much lower, say, September—October 7s. 3d.; November—December 6s. 8d.

Soft Fine.—Near was sold at 7s. 10d. downwards, closing value about 7s. 5d.

Negrohead.—Flat and lower, sellers scrappy about 4s. 9d. Cameta at 3s. 9d. Island at 3s. 2d.

Caucho Ball.—3d. lower, value, near about 4s. 5d., distant about 4s. 6d.

Public sale prices up to 1.30 p.m. (lunch time) ruled as follows:—

Plantation, Malay.—Sheet, fair to fine, 7s. 8½d. to 7s. 10d. Fine smoked, 8s. 4d. Mixed inferior no bids. Crêpe good to fine pale, 7s. 6½d. to 7s. 9½d. Fair to good palish, 7s. to 7s. 5½d. Light brown and grey, 6s. 9½d. to 6s. 11½d. Clean brown, part dark, 5s. 6d. to 6s. 3d. Dark brown, part specky, 4s. 9d. to 5s. 2d. Black and soft, 4s. to 4s. 8d. Scrap and virgin pieces, fair to fine, 4s. 11d. to 5s. 2¾d.; mixed, inferior, 4s. 3½d.

Ceylon.—Biscuit and sheet, fine, 7s. 8½d. Middling, no bids. Crêpe, fair palish, 7s. 6d. to 7s. 8d., thick golden, 7s. 11½d. Dark Brown, 4s. 6d. to 5s. 6d. Scrap, common to fine, 4s. 4½d. to 5s. 1½d.

Rubber Pará statistics for the month of July (tons):—

	Pará.	Caucho.	1909.		1908.	1907.	1906.
Receipts at Pará ..	1,060	340 =	1,400	agst	1,310	1,370	1,840
Shipments to Europe	410	290 =	700	,,	660	850	690
,, America	710	10 =	720	,,	840	450	960

Crop statistics, June 30th, 1908, to June 30th, 1909:—

		Pará.	Caucho.	1908-09.	1907-08.	1906-07.	1905-06.
Pará Receipts	1908-09	30,010	8,080	38,090	36,650	38,000	34,490
	1907-08	29,180	7,470				
,, Shipts.,	Europe	13,570	5,630	19,200	21,740	19,300	20,125
,, ,,	America	16,560	2,490	19,050	14,670	18,730	14,295

Rubber Shares.

The fall in the price of the raw material resulted in lower quotations on August 12th for most Rubber Plantation Companies' Shares. Though the present price of Rubber (about 8s. 2d. "spot" and 7s. 4d. August-September) shows a distinct drop from the highest figure touched, the realizable profit to producers is still very handsome indeed, and we do not think there need be any nervousness amongst shareholders as to the future of the industry. It is not to be expected nor to be desired that the price of Rubber should remain at an unduly high level; demand is automatically lessened as the price of the material increases, and *vice versa*.

Comparative prices with last month rule as follows:—

	August 12th	July 8th
Bukit Rajah	8 to 8¼	.. 8⅛ to 8¼
Cicely Estates Co.	9½ to 9¾	.. 9½ to 9¾
Highlands and Lowlands ..	2⅛ to 2¼ p.	.. 36/- to 37/- p.
Klanang Produce Co. ..	5 to 5¼	.. 4⅞ to 5
Lanadron Estates	4½ to 4¾	.. 2⅛ to 2¼ p.
Linggi Plantations ..	21/6 to 22/-	.. 22/6 to 23/-
Perak Rubber Co.	2¾ to 2⅞	.. 38/6 to 39/6
Selangor Rubber Co. ..	31/6 to 32/9	.. 30/- to 31/-
Shelford Rubber Co. ..	27/- to 28/-	.. 23/6 to 24/6
United Serdang Rubber Co.	3⅛ to 3¼	.. 50/- to 52/6
Vallambrosa Rubber Co. ..	21/3 to 21/9	.. 22/6 to 23/-

p. = premium.

A valuable addition to the Cambridge Biological Series is "Agriculture in the Tropics." By Dr. Willis, Director of Agriculture, Ceylon. (Demy 8vo, cloth, pp. xviii.+222, with 25 plates. Price 7s. 6d. net. The Cambridge University Press.) If, as Dr. Willis, with his usual modesty, claims, this is not a book to teach the practical man how to plant, it is decidedly a book to show the ordinary stay-at-home individual why he should plant, where he can plant, and what he can produce. Such a book well circulated, as this book is certain to be, among the well-to-do classes at home and elsewhere, will undoubtedly go a long way to stimulate a healthy interest in the Tropics and tropical undertakings. For this reason we are very glad to see it. Even for the practical planter it has many useful points, as we shall show in our review of the book next month.

Cotton.

THE following were the prices for Cotton in London on August 12th, according to Messrs. Slann and Davies: —

	Good Fair.	Good.	Fine.	Superfine.	Good 1908.	Good 1907.	Compare
	d. d.	d. d.	d. d.	d.	d. d.	d. d.	
Surat kinds* ...	$5\frac{1}{16}$ to $5\frac{11}{32}$	$5\frac{3}{8}$ to $5\frac{7}{8}$	$5\frac{9}{16}$ to $6\frac{3}{16}$	—	$4\frac{9}{16}$ to 5	$4\frac{13}{16}$ to $5\frac{15}{16}$	per lb.
Madras	$5\frac{1}{2}$ to $5\frac{5}{8}$	$5\frac{1}{8}$ to $5\frac{7}{8}$	—	—	$3\frac{7}{8}$ to 5	$4\frac{13}{16}$ to $5\frac{3}{4}$	—
Bengal	—	$4\frac{7}{8}$	$5\frac{1}{8}$	$5\frac{1}{4}$	$3\frac{5}{8}$	$3\frac{7}{8}$	—
Assam	—	$5\frac{1}{4}$	7	$7\frac{3}{4}$	$4\frac{1}{4}$	$5\frac{1}{4}$	—
China	—	$5\frac{3}{8}$	$5\frac{7}{8}$	$6\frac{1}{8}$	$4\frac{1}{2}$	$5\frac{1}{8}$	—
West Indian ...	$5\frac{1}{2}$	6	$6\frac{1}{2}$	$7\frac{1}{4}$	$6\frac{1}{8}$	$8\frac{1}{4}$	—
Sea Island ...	$7\frac{1}{2}$	$9\frac{3}{4}$	14	17	$9\frac{1}{2}$	14	—
Australia	$6\frac{5}{8}$	7	—	—	$6\frac{3}{8}$	$7\frac{7}{8}$	—

* Liverpool quotations.

American Cotton has fluctuated from day to day, under the influence of varying weather reports and much manipulation, and we close for the week with a gain of 6 to 12 points in "Futures" and 2 points in Spot, which is now 6·66d. for Middling. The demand in Liverpool is quiet, and Manchester reports only a limited business doing, often at unremunerative prices, and many mills closed during holidays. There is not much doing in East Indian Cotton, and prices show but little change.

The import into Liverpool this week, ending August 14th, amounts to 26,415 bales; since September 1st, 4,278,435, same week last year 20,224, last year's total 3,651,879 bales. The estimated Sales amount to 49,000 bales. Middling American is quoted at 6·66d. per lb.; last year, 5·92d.; 1907, 7·27d.

The latest quotations of Americans for delivery, basis middling, any port, G.O.C., were :—

	August 12th.	Last Week.	Last Year.
	d.	d.	d.
August	6·54	6·42	5·68
Aug.—Sept.	6 45½	6·34	5·29
Sept.—Oct.	6·42	6 34	5·08½

Movement of American Cotton since September 1st :—

	1908-9.	1907-8.	1906-7.
Brought into sight	13,462,000	11,192,000	13,414,000
Exports from United States since September 1st—			
To Great Britain	3,522,000	2,904,000	3,761,000
To Continent, &c.	4,595,000	4,235,000	4,336,000
Total crop	—	11,571,963	13,510,982

Sugar.

MR. C. CZARNIKOW, writing on August 5th, reported that during the week there was a further improvement, caused by a continuance of cold and wet weather, chiefly in Western Europe, improved quotations from America, and a better demand for refined sugar, good foreign granulated especially being very scarce, moving from 12s. 8¼d. to 13s. for ready. The liquidation of August beet has continued to a certain extent; in the main, however, engagements have been transferred to the last ten days of the month, as well as to September, which may, if the beet crops continue as much behindhand as they are at present, enable speculators to realize their holdings by supplying actual requirements on better terms than they would have been able to do had the conditions become normal. French crystals are kept above our reach, and in the absence of Russians our supplies will be very moderate at the end of the season, especially if most cane sugars now afloat are diverted to America. One Java cargo, per *Queen Alexandra*, is reported sold to the United Kingdom to-day.

The American market is being watched with considerable interest, and probably with very good reason, as their prospective supplies are moderate, should their meltings continue at or slightly below 50,000 tons per week. The American and Cuban stocks together amount to-day to 429,000 tons, but have, of course, still to be partially purchased. Porto Rico and Hawaii may supply about 65,000 tons in August—September, whilst Java has shipped available for the States 24,000 tons in June, and 65,000 tons in July, of which, of course, part may still be diverted to Europe during the next three weeks. As far as we can estimate the shipments of the West from Java for August, they point to about 50,000 tons, against 133,000 tons last year, but can, of course, become larger if American refiners make up their minds to enter the markets; they have come nearer to European prices, and it is said that one cargo afloat has been sold during the week to the States. The supplies in August—September would, therefore, amount to between 600,000 to 650,000 tons, with meltings of 420,000 to 450,000 tons. The quotation for spot sugars has further improved to 4·05 cents for centrifugals = 10s. 10½d. c.i.f. for 96 per cent., Java = 9s. 10½d. f.o.b. Hamburg for 88 per cent. nett beet.

Cane sugar in the United Kingdom has been more active; where transactions have taken place, prices are rather in sellers' favour. Grocery crystallized has sold more freely at fully previous rates.

From cane-producing countries there is no news of special interest.

With British West India there have been no auctions during the week owing to the Bank Holiday, but privately about 6,000 bags have been sold at fully previous rates. Crystallized Trinidad, low brown 14s. 3d. duty paid, low middling yellow 14s. 4½d. to 14s. 6d., middling yellow 14s. 9d. to 15s., good middlings 15s. 1½d. to 15s. 3d., good yellow and pale 15s. 6d.

In Liverpool 4,225 bags of Brazilians sold at 8s. to 8s. 3d. quay terms.

Tea.

By Messrs. WM. JAS. AND HY. THOMPSON.

THE feature of the opening auctions in August has been the widespread demand for all grades of good and fine tea, coupled with a steady tone for the more ordinary descriptions. Among Ceylons the large quantity on offer was readily absorbed by the Trade, and taken as a whole the result showed that the higher grades realized the better prices.

Offerings of Indians were on much the usual scale for the time of year, 32,223 packages, of which 29,247 packages were new crop, against 32,970 packages in 1908-9. The quantity of new season's tea advertised to date (including Southern Indian teas since August 1st) amounts to 58,280 packages, compared with 55,888 packages a year ago. The attractive quality now coming forward from Assam ensured strong competition for all good medium and fine kinds; the results to importers should be encouraging. Medium grades were steady to firm. There was a rather better enquiry for Darjeelings noticeable, and, although the proportion of really flavoury teas is not large, some good prices have been paid for desirable invoices. Low medium and common descriptions were in good demand. There has been a fair amount of orders in the room from shippers, who have dealt chiefly in the better-class Pekoes. For fair average Pekoe Souchong the quotation is 6⅛ per lb. The average for the whole sale was 9¼d. per lb., against 7¾ per lb. last year.

Accumulations of Ceylons during the holidays resulted in a heavy sale, 40,767 packages being offered against 36,627 packages last year. The auction passed with good all-round competition, very few parcels being withdrawn. Quality is still somewhat irregular, but where improvements were shown advances were paid on previous rates. Clean black leaf was obtainable at 5¾d., but only in small quantity, though the market can hardly be said to be quotably dearer for this grade. Medium brokens sold at full rates, compared with last sale, while medium to good leaf tea was well supported. The higher grades of brokens, particularly those showing stand-out quality, met the chief enquiry. Dust and Fannings sold at slightly higher values than those ruling before the holidays. The average for the entire sale was 7⅞d. per lb., against 7¼d. per lb. last year.

Several steamers with China tea have arrived, bringing chiefly Kintucks and medium-priced Monings. The quantity put on offer was moderate, as a fair amount had been sold "to arrive," and the general supply is less than last year. The market, more especially for Kintucks, has continued steady to firm, with a fair business resulting, the feature of note being the arrival of Ichangs —a large amount of which had been sold on Muster samples from about 1s. 2d. to 1s. 10d. per lb. Lower grades of black leaf from 4½d. to 6d. per lb. have been dealt in, and also in medium Monings from 7½d. to 9d. per lb. There has been a good demand for Souchongs, the tarry character being appreciated by the trade, from 11d. to 1s. 2d. per lb. for medium, and 1s. 8d. to 2s. per lb. for fine, a considerable amount also being sold to arrive.

The best averages for Java were: Goalpara, 10½d.; Tjiwangie, 8½d.; and 7⅝d. per lb. was realized for the whole sale, against 6½d. per lb. last year.

Coffee.

By Messrs. C. M. AND C. WOODHOUSE.

The market reopened on August 5th, after the Bank Holiday, and 2,163 bags of all descriptions were offered; there was a rather slow demand at about steady prices and rather over 1,000 bags were sold at unchanged rates. There has been very little doing in the market for "futures," and prices for December Santos show little change from last week. We quote:—

		1909. To-day.	July 29th.
London ..	Santos, Dec. delivery.	27s. 10½d.	27s. 10½d.
New York ..	No. 7 Rio ,,	5·30 cents	5·25 cents.
Hamburg ..	Santos ,,	30 pf.	29¾ pf.
Havre ..	Santos ,,	38¾ francs	38½ francs.

The receipts at Rio and Santos from July 1st to August 4th, 1909, were 2,006,000 bags, against 1,264,000 bags and 981,000 bags in the two previous seasons respectively.

Sales include the following, viz.:—

East India.—53 bags.

Mysore.—46s. 6d. for smalls, 50s. for medium, 53s. 6d. for bold.

Neilgherry.—50s. for smalls, 54s. to 57s. for medium, 59s. to 64s. for bold.

Costa Rica.—450 bags, at 54s. 6d. for smalls, 50s. to 59s. 6d. for fine fine ordinary to middling, 59s. to 65s. 6d. for bold.

Guatemala.—230 bags, at 46s. for smalls, 42s. to 51s. for good ordinary to middling, 55s. to 58s. for good middling bold.

Salvador.—87 bags, at 52s. to 53s. 6d. for good middling.

Nicaragua.—85 bags, at 41s. 6d. for foxy green, 46s. to 47s. for fine fine ordinary.

Colombian, &c.—200 bags, at 53s. to 54s. 6d. for good middling.

UNSOLICITED TESTIMONIAL ON "TROPICAL LIFE."

IN their issue of July 16th, the *London Standard* included the following paragraph on the work that we are doing to stimulate interest in the Tropics.

"Mr. H. Hamel Smith's excellent monthly, TROPICAL LIFE, gives such full details of all agriculture suitable to residents in the sub-equatorial regions that we have every pleasure in stating that it can be procured at 83, Great Titchfield St., W., for 1s. We believe there are subscribers of our own who may be glad to send it out to relatives in the countries to which it applies."

The London Cocoa Market.

By THE EDITOR.

I WAS in hopes of being able to give this month the six months' figures for the six chief consuming centres, but can do so only for four out of the six as follows:—

Raw Cocoa—Delivered for consumption, less re-exports—

		1909.	1908.	1907.	
U.K. ..	.. 6 months	12,187	11,214	10,225	Tons (Engl.).
Germany	.. 6 ,,	20,155	15,454	18,268	,,
France ..	.. 6 ,,	11,252	9,320	11,605	,,
Holland ..	.. 6 ,,	12,529	9,669	8,721	,,
Total	.. ..	56,123	45,657	48,819	,,
Add U.S.A.	.. 5 months	29,416	15,370	18,392	,,
Belgium ..	.. 5 ,,	2,750	2,410	1,870	,,
Comparative Totals		88,289	63,437	69,081	,,

The two following tables are of interest, the first to compare the increases during the month of May, and the second to show how 1908 and the years previous worked out as regards total deliveries for the twelve months.

		1909.	1908.	1907.	
U.K. ..	.. 5 months	10,962	9,723	8,843	Tons (Engl.).
Germany	.. 5 ,,	17,603	13,313	15,510	,,
France ..	.. 5 ,,	9,314	7,900	9,727	,,
Holland ..	.. 5 ,,	10,023	8,197	7,063	,,
Belgium ..	.. 5 ,,	2,750	2,410	1,870	,,
Total	.. ..	50,652	41,543	43,013	,,
Add U.S.A.	.. 4 months	25,992	11,926	15,681	,,
Comparative Totals		76,644	53,469	58,694	,,

As shown in our June issue, the U.S.A. figures for January to March were only 12,360 tons, against 8,482 in 1908, and 12,920 tons in 1907.

The twelve-month totals below appeared in the February issue, but I reproduce them to show how the latter part of the years quoted progressed.

Raw Cocoa—	1909.	1908.	1907.	
U.K.	20,719	19,842	19,816	Tons (Engl.).
U.S.A.	40,568	35,250	39,180	,,
France	20,142	22,837	23,058	,
Germany	33,726	33,867	34,600	,,
Holland	24,854	20,480	20,917	,,
Total	140,009	132,276	137,571	,,

Before entering into the details of the market, having given so many tables *re* consumption, another showing the output at the producing centres may not be out of place, say :—

	1908-9.	1907-8.	1906-7.	
Grenada, Oct. 1st to July 24th	64,573	62,231	57,477	bags.
Trinidad, ,, ,,	247,446	213,837	142,172	,,
	1909	1908	1907	
San Thomé, Jan.-July ..	318,355	260,200	200,052	,,
Bahia ,, ..	195,703	247,427	156,936	,,
Pará, Jan.-June	3,016	1,588	1,102	tons.
West Coast Africa, Jan.-March	6,463	3,855	1,702	,,
San Domingo, ,,	9,123	11,411	6,217	,,
Guayaquil, Jan.-July ..	460,500	390,300	260,500	qtls.

No sales took place on August 3rd, owing to the Bank Holiday, but the prices given below are based on the important sales held on August 10th, when 9,000 bags were offered, including Ceylons, Grenadas, Jamaicas. The markets generally, both here and on the Continent, if tending lower, remain steady, and prices are fairly well maintained. Hamburg, which was busily engaged underselling other centres, is now covering contracts, so shows less disposition to quote lower prices than its rival markets. This is beneficial for most sellers, but especially for Bahia. The trend of events, and immediate prospects, again cause us to state that, during the coming autumn, London with its public sales will be the best centre for the disposal of "spot cocoa," as with the heavy outputs from all the centres (as shown above), except San Domingo, it requires all the competition one can get to move the cocoa off at remunerative prices. As it is, planters are grumbling loudly over the difficulty of selling even at present prices, and what it must be when the producer is laid up with only a single, or at the most two buyers, I do not wonder that they find things go slow and low. There is nothing like a London public sale for stimulating demand when there is a surplus of supplies to move off.

A matter that must not be lost sight of, but which many, in fact most, cocoa men do not seem to realize, is that if America, as shown above, has drawn very heavily this year on the world's cocoa supplies, the cocoa has not all gone into consumption. Until quite lately New York, the same as Liverpool on this side, kept practically no stock worth troubling about, whereas at the end of July she had 93,000 bags, as follows :—

New York Stocks.	July 27th, 1909.	Compare December 31st. 1908.	1907.	1906.	
Bahia	17,696	6,964	3,690	6,369	bags.
Venezuela	19,221	7,246	4,729	780	,,
Guayaquil	13,003	8,876	4,046	773	,,
San Domingo	13,892	2,783	2,811	336	,,
Trinidad	9,578	1,244	836	2,378	,,
Grenada	3,209	810	1,589	1,039	,,
Pará	3,746	3,115	—	—	,,
Surinam	2,866	331	—	116	,,
Cuba	4,551	1,201	200	65	,,
Accra	713	—	335	—	,,
San Thomé	563	6,492	357	2,388	,,
Cauca	1,293	—	462	—	,,
Jamaica	1,871	56	—	90	,.
Savanilla	779	17	93	—	,,
Java	—	467	—	1,243	,,
Various	135	328	89	131	,,
Totals ..	93,116	39,930	19,237	15,708	,,

On this basis, combined stocks would work out as follows :—

	End July, 1909.	End Dec., 1908.	End Dec., 1907.	End Dec., 1906.	
Havre	202,893	136,253	71,436	67,175	bags.
London	114,107	67,624	35,706	44,533	,,
New York	93,116	39,930	19,237	15,708	,,
Comp. Totals ..	410,116	243,807	126,379	127,416	,,

Those, therefore, who complain of present prices, and consider they are right in holding back in the hopes of doing better later, must take careful note of above. I consider that prices, considering the heavy output, have remained very steady. If they have fallen, it has been much more slowly than might have been expected in the face of such heavy stocks. The stock of San Thomé at Lisbon is rather lower than at the end of the year, or, to be exact, on December 19th last. At the end of July it was 112,000 bags, on December 19th 125,641, against 59,828 in 1907, and 83,490 bags in 1906.

Although we have already had a heavy dose of figures, I suppose that I had better still give the full figures of the stock at Havre and London, say :—

Havre. July 31.	Stock. 1909.	Value. Fcs.	Stock. 1908.	Fcs.
Pará	22,363 ..	65 to 78 ..	5,971 ..	74 to 80
Bahia	11,237 ..	65 ,, 70 ..	14,278 ..	67 ,, 72
Venezuela ..	41,909 ..	67 ,, 140 ..	34,149 ..	70 ,, 160
Trinidad ..	40,193 ..	68 ,, 70 ..	33,124 ..	75 ,, 82
Other W.I. ..	6,667 ..	61 ,, 69 ..	10,531 ..	67 ,, 75
San Thomé ..	7,848 ..	66 ,, 68 ..	1,086 ..	62 ,, 72
San Domingo	20,061 ..	58 ,, 62 ..	14,390 ..	62 ,, 67
Hayti	12,849 ..	50 ,, 64 ..	14,639 ..	50 ,, 70
Accra	11,838 ..	57 ,, 60 ..	9,101 ..	65 ,, 70
Guayaquil, &c.	27,928 G'L	68 ,, 80 ..	20,208 G'L	87 ,, 100
Total ..	202,893 bags.		157,477 bags.	
		July, 1907	78,439 ,,	

London, August 14th.	1909. Bags.	1908. Bags.
Trinidads ..	17,562 ..	19,512
Grenadas ..	17,790 ..	11,899
Other W.I. ..	6,866 ..	5,368
Ceylons & Javas	21,876 ..	13,476
Guayaquils ..	17,342 ..	16,133
Brazil and Bahia	1,049 ..	1,382
African ..	16,255 ..	10,359
Other foreign ..	13,537 ..	9,460
Total ..	112,277 ..	87,589

The Board of Trade figures to the end of August for the United Kingdom show an increase for the month of August only of 271 tons in the deliveries for home consumption, but a falling off in exports of 88 tons. The figures for the seven months are :—

Raw Cocoa only—	Landed.	Deld. H.C.	Exported.	Stock, July 31st.
Jan.-July, 1909—	23,298	13,934	3,512	11,098 tons
,, ,, 1908—	20,299	12,689	3,196	7,087 ,,
Increases	2,999	1,245	316	4,011 ,,

In August only 1,747 tons were delivered for home consumption, against 1,476 last year, and 1,600 tons in 1907.

Coming to prices, Grenadas, although in heavy supply, have sold freely and kept up in value wonderfully. Both exporters and the home trade have been buyers. Trinidads have been in fair request, but needed more persuasion and manipulation to move off; holders, however, show no idea of giving way, and as the stock on this side is lower than last year, and prices at the centre of production remain steady, there is no reason why they should do so. Bahias are steady, Hamburg being rather less of a "bear" for the moment.

A growth that should receive much more attention, and sell more freely than it has been doing, is Jamaica. The quality is good and the quantity substantial, whilst the idea as to value is proportionately low against Grenada. In spite of this, only 200 bags sold out of 900 offered at the sales on August 10th. Guayaquils remain quiet. With all growths it will be noticeable that the finer qualities are the most inclined to give way. At the time of going to press (August 18th) I would quote as follows :—

Trinidads.—Fine marks, 57s. to 59s.; superior, 61s. (nominal); middling to good red, 54s. to 56s.

Grenadas.—Good to fine, 53s. 6d. to 54s. 6d.; common unfermented to good fair fermented, 50s. to 53s.

Dominicas.—Good are worth 52s. to 53s., but for these there are no buyers; ordinary unfermented to fair fermented sold at 48s. to 51s.

Jamaicas.—One lot bright red realized 53s.; fine bright mixed with dull, 52s. 6d.; good dull reddish, 52s.; ordinary unfermented to fair fermented, 48s. 6d. to 50s. 6d.

St. Lucia.—Fine is worth 53s. to 54s., and sold at 53s. 6d.; ordinary unfermented realized 48s. 6d. to 49s. 6d.

Montserrat.—Fine bold, 64s. 6d.

Surinam.—Good red, 59s.

Costa Rica.—Middling to good reddish, 50s. to 54s.

West African.—Fair reddish, 47s. to 48s. 6d.

San Thomé is nominally worth 53s. for fine.

Bahia is worth 54s. for superior, though some value it 1s. more.

Cameroons last sold at 54s., but cannot now be valued above 52s.

Samoa.—Fine bold, last sold at 73s., good boldish, 70s.

Guayaquils.—Summer Arriba has been selling 66s. to 68s., though latterly at 64s. 6d. to 66s., and fair to good Caraquez at 60s. to 61s. 6d. Tumaco last sold at 52s., and Machala is worth 58s. to 60s.

Ceylons, after hanging back, have been selling much more freely at lower rates, including good to fine bold, 68s. to 74s.; fair to good medium and bold, 54s. to 61s. 6d.; native, 43s. to 46s.

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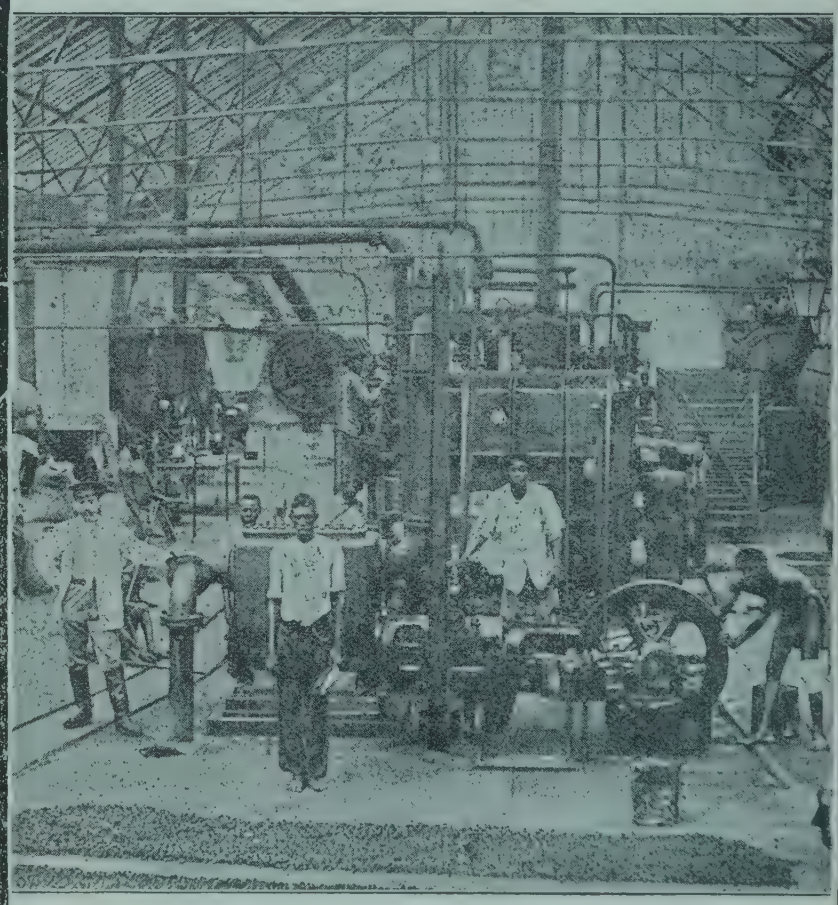

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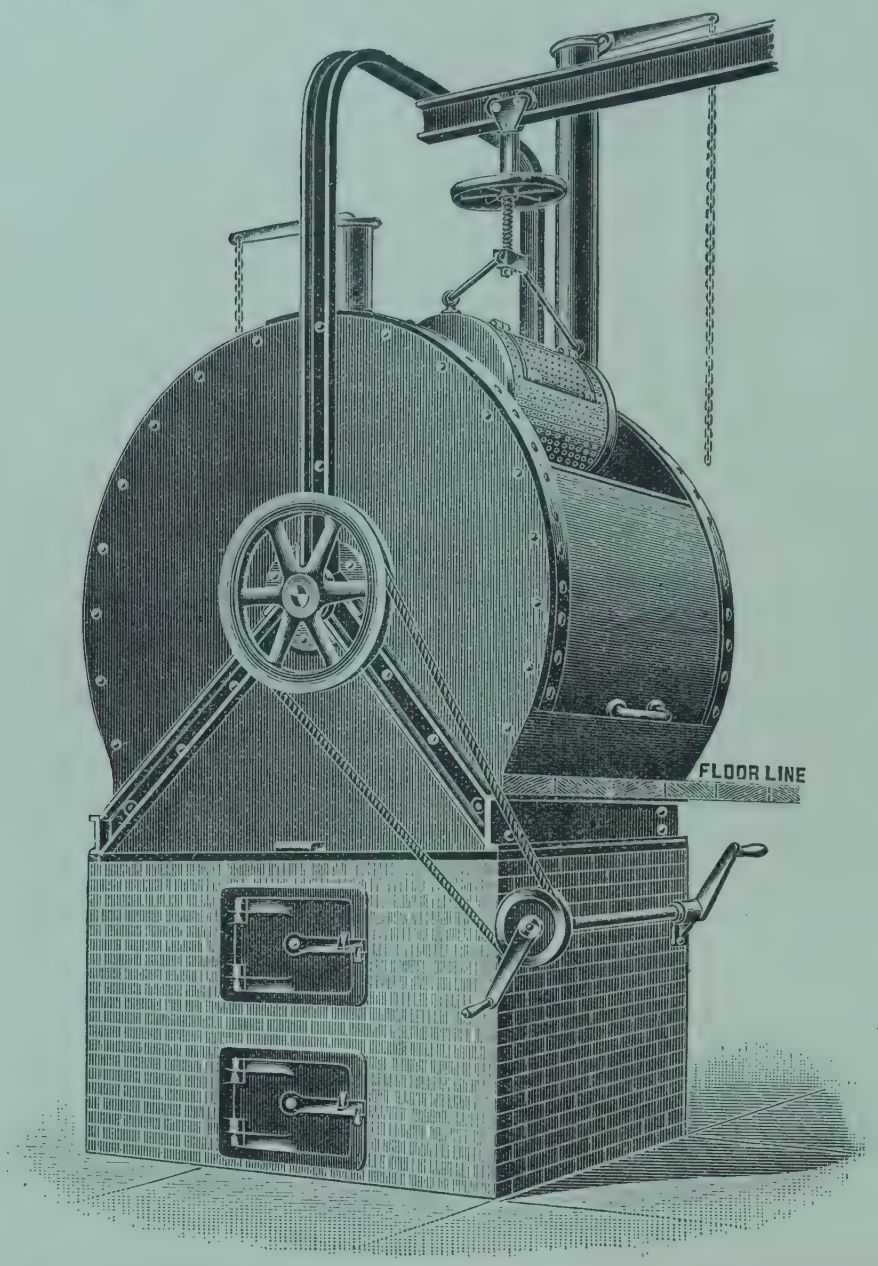

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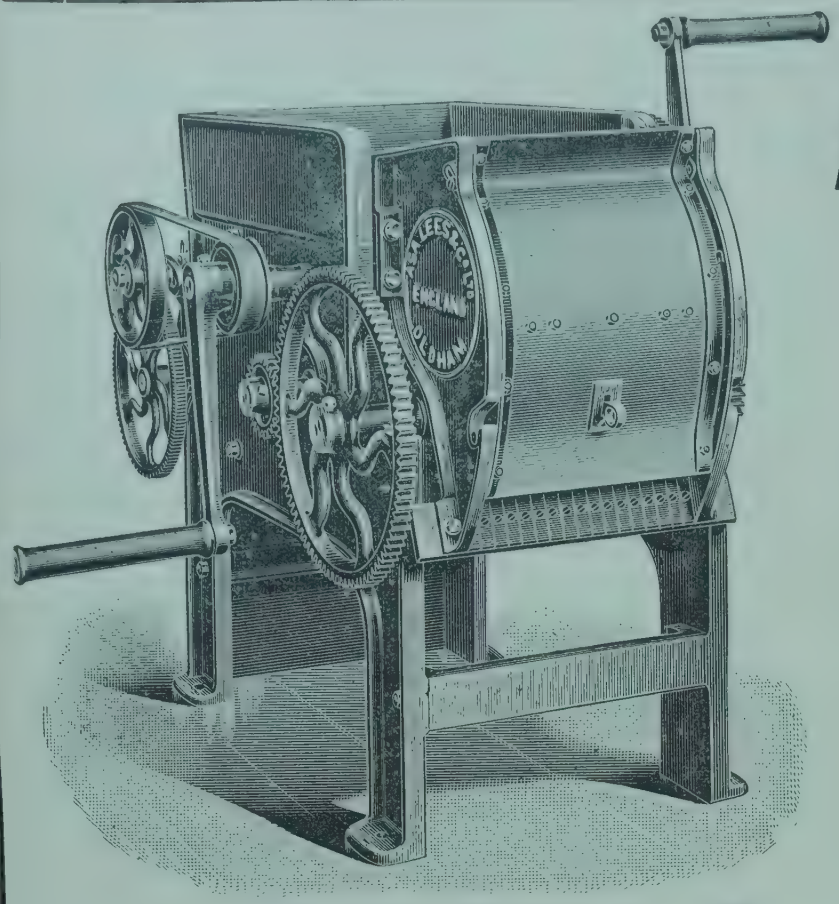

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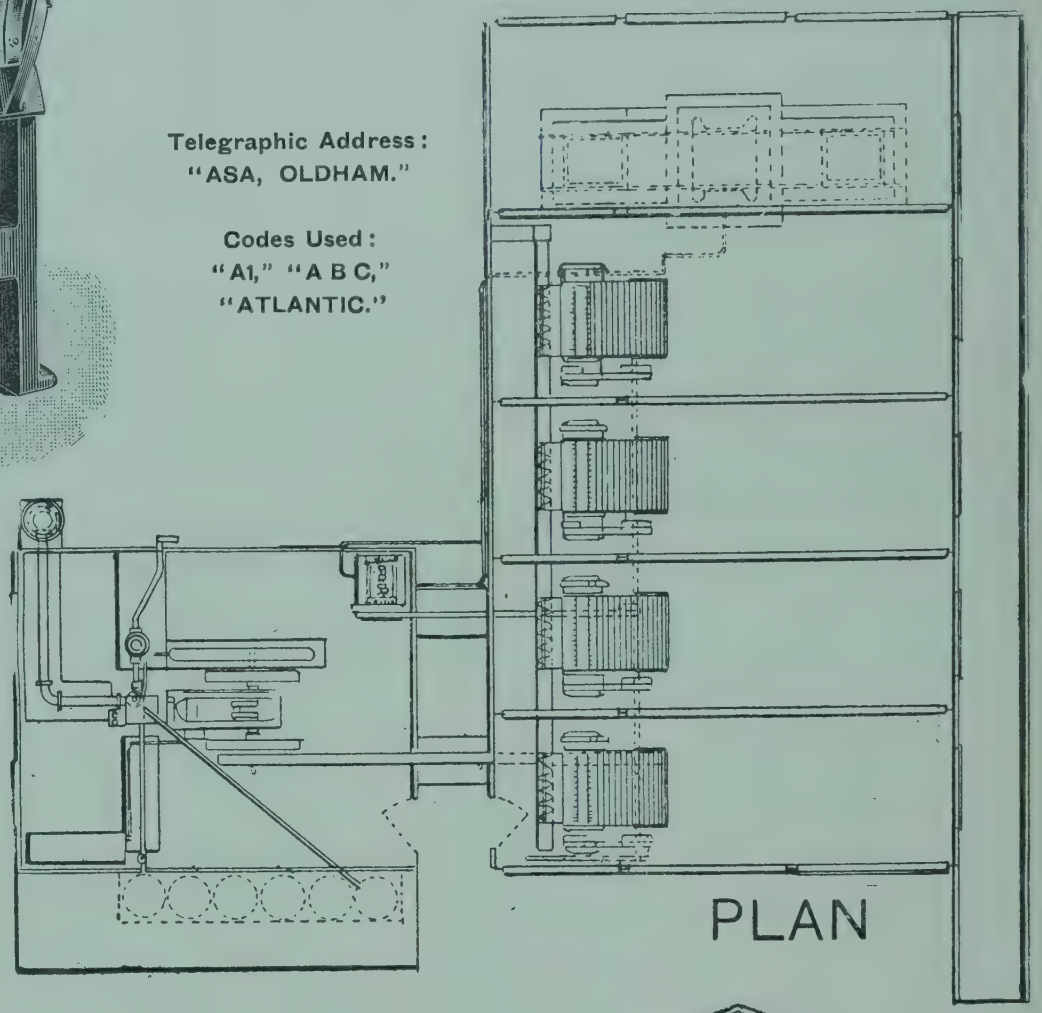

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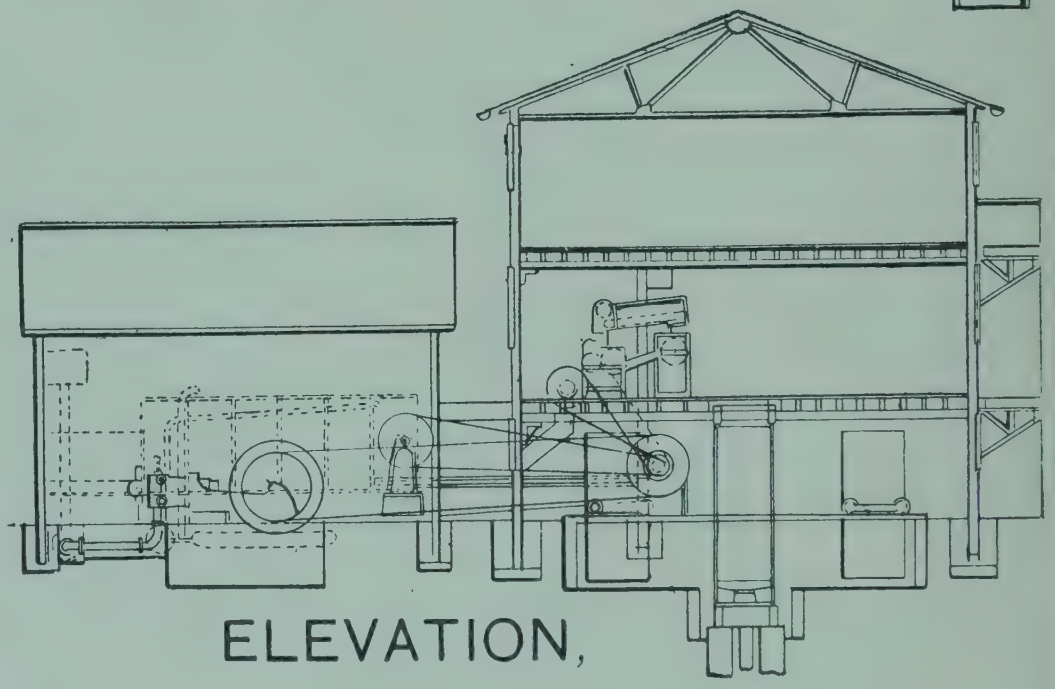

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Tropical Life:

A Monthly Journal devoted to the Interests of those living, trading, holding property, or otherwise interested in Tropical and Sub-Tropical Countries.

VOL. V.—No. 9.] SEPTEMBER, 1909. [ANNUAL SUBS., 10/- / SINGLE COPIES, 1/- } POST FREE.

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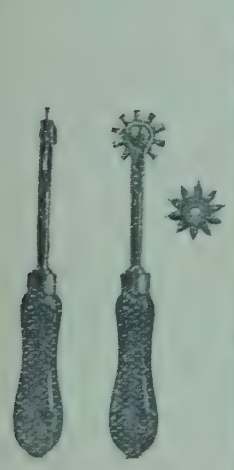

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"Tropical Life" Prize for the best Essay on The Fermentation and Drying of Cacao.

FOR those who have not seen our previous issues we would again state that we are offering a prize of £50 for the best essay on :—

The Fermentation and Drying of the Cacao or Cocoa Bean (*Theobroma cacao*).

The essay should record precisely and in full detail the changes resulting from the processes of fermentation and drying that take place in the bean from maturity in the pod to the time of putting the cured beans into bags for market. Biological as well as chemical changes should be noted. The action of maximum, minimum and optimum temperatures, and of checks producing differences of times in the fermentation and drying processes should be noted for every stage. The differences due to such variations on the resultant cured bean should be clearly traced. The possibility should be discussed of producing at will by such variations, and independently of the natural character of the bean, varieties of taste and of colour, both internal and external, so as to simulate the different kinds of cocoa known on the market. Alterations that might be made in ordinary methods so as to improve the quality of the cocoa should be explained. Waste products should be considered, and their potential value indicated.

The experiments on which results are based should deal with the beans in marketable quantities, and samples should be submitted in illustration of statements made.

The terms on which all candidates enter the competitions are as follows :—

(1) The copyright of all essays sent in becomes the property of the publishers of TROPICAL LIFE absolutely, whether successful in winning the prize or not.

(2) The publishers of TROPICAL LIFE have the sole right of publishing the essays, and the copyright of such publication to be vested in them. Permission to publish in any language must be obtained from the publishers of TROPICAL LIFE.

(3) Every candidate or competitor agrees to accept as final and to abide by the award of the Editor of TROPICAL LIFE, whose decision in the matter must be taken as binding. No correspondence can be entered into respecting the awards.

(4) An English translation must accompany all essays not written in that language, so that the onus and risk as to correct translation will rest with the competitor.

(5) Essays must be written on one side of the paper only; when possible the essay should be typewritten. In any case the writing must be clear and distinct. Corrections causing doubt or difficulty to decipher must be avoided.

(6) All essays must be sent to the Editor of TROPICAL LIFE, at his City Office, 112, Fenchurch Street, London, E.C., to reach him on or before January 31st, 1911.

No essay arriving after that date will be eligible for competition. Every essay will be acknowledged on receipt.

(7) Every essay sent in must have attached to the head of the first page the competitor's full name and postal address. In submitting the essays to the Judges, the name, however, will not be made known until after the prize is awarded.

(8) After the prize has been awarded any balance left over will be devoted to publishing those essays which, in the opinion of the publishers, are considered of sufficient merit.

(9) Competitors must fill in and attach the following coupon to their essay.

"TROPICAL LIFE" PRIZE FOR THE BEST ESSAY ON THE FERMENTATION AND DRYING OF COCOA.

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Sisal Cultivation—Part VIII.

FIBRE CONGRESS AT SOURABAYA IN 1910.

Special Attention to be given to Sisal and Manilla Hemps.

WITH a view to promoting the cultivation of fibre-producing plants, the Nederlandsch-Indisch Landbouw Syndicaat has decided to hold, at Sourabaya, Java, Netherlands East-India, in October, 1910, a Congress, combined with an Exhibition of fibre-producing plants, of the fibres produced therefrom, and of the machinery used in the preparation of same.

During the Congress, the cultivation and preparation of the raw fibre, both mechanically and manually, will be discussed. The extraction, preparation for market, and packing of the fibre will, as far as possible, be demonstrated. Various prizes (medals, diplomas, and money prizes) will be offered for machinery. Such prizes will be awarded to the exhibitors of machines which shall work for a sufficient time during the Congress and be considered worthy of an award by a committee of impartial experts.

The expenses of the Congress and Exhibition will be defrayed by the Syndicate, which is enabled to do so by a liberal grant from the Netherlands Indian Government, and substantial contributions from commercial houses and private persons.

In conjunction with the Director of Agriculture, a Committee has been formed to prepare and carry out the scheme, whilst a number of gentlemen in Holland have been requested to form a Sub-Committee there.

A prominent place in the programme will be given to the consideration of the cultivation and preparation of those fibres most suitable for culture on a large scale in the Tropics.

Special attention will be given to the following, viz. :—

(1) Agave Fibre (*Agave rigida*), the cultivation of which is spreading so largely, and which is specially adapted for dry tropical countries.

(2) Manilla Hemp (*Musa textilis*), also a fibrous plant fit for cultivation on a large scale, which produces a profitable crop in the moister districts of tropical countries.

(3) Jute (*Corchorus capsularis*) and Jute Substitutes. Of importance in all tropical countries, seeing that a large part of the packing material necessary for other produce is made therefrom.

As the cultivation of fibres 1 and 2 and the like can only be remunerative when carried on with efficient machinery for the treatment of fibre on a large scale, and when suitable hand-machines be available for the use of the small producer, special attention will be paid to the testing of machines sent in for exhibition, both as regards the extraction and treatment of the fibre.

In addition to the above named, other fibres may be dealt with more or less fully, according to the interest shown at the Congress.

A detailed programme will shortly be published, dealing with the project in all its particulars, and enumerating the prizes to be awarded.

This preliminary notice will serve to make known to all those interested in the cultivation of fibres the opportunity shortly to be offered of exchanging ideas on the subject. Further particulars will be published as soon as received.

PIONEERING. By Frederic Shelford, B.Sc., M.I.C.E., 82 pages, price 3s. net., in strong cloth cover. London: Spon, Limited, 57, Haymarket; and New York: Spon, 123, Liberty Street. With an introduction by Sir George Taubman Goldie.

THIS useful book consists of a series of four articles originally contributed by the author to the *Engineer*, but now revised and brought up to date. It contains some excellent items of advice. Among others it urges young men before they settle down to go round the Colonies and see a little of the world. This is what we have urged from the beginning. We would like to do more. Every young man, whose ability and time is not being used to the best advantage for the country on this side, should be made to go abroad to push our trade on the other side. When men, ragged and down at heel, loaf round and do not work to the best of their ability, we call them "tramps." Such men are not tolerated. Many well-dressed men, however, are just as great loafers and time-wasters as the recognized tramp; and with such a future as we have before us, with taxes increasing and incomes decreasing, it behoves every man to do his best to bring increased wealth to this country. Those doing otherwise shirk their duty in the battle for international supremacy every whit as badly as does a skulking soldier in ordinary warfare. This book, which is more particularly addressed to those who would or could be engineers, surveyors, planters, &c., shows you how to start, what to take, and what to leave behind. A very good little book; we hope that ten thousand young fellows may secure a copy by the end of next year, and set off in search of health, wealth, and happiness in the Colonies and Tropics. All three are there for those determined to find them.

The Cultivation of Cacao.

No. XVII.

THE WITCH-BROOM DISEASE IN SURINAM.

IT will be remembered that in the very first issue of TROPICAL LIFE we included what was at the time the only communication that had been published on the subject of the witch-broom disease in Surinam, and Dr. van Hall very kindly promised to keep us posted up in the progress of the investigations that have been carried on under his guidance. Pressure of work, however, as the Doctor mentioned in the letter published last month, prevented his doing so. "I am sorry," Dr. van Hall wrote, "that I did not contribute anything to TROPICAL LIFE, but the last two years have been very busy, and presented so much work, and so many difficulties, that I had no time for writing letters."

The *Journal of the Board of Agriculture of British Guiana* for January, and *L'Agronomie Tropicale*, the monthly organ of the Soc. d'Etudes d'Agriculture Tropicale, both give excellent translations of what Dr. van Hall and Mr. A. W. Drost, of the Research Station at Paramaribo, Surinam, have so far published on the matter.

The cause of the disease, Dr. van Hall and his colleagues now claim, is due to the fungus discovered by Professor Went, named by Went and Damsté *Colletotriehum luxificum* (Latin, *luxus luxuriant*). Previous to Professor Went's investigations the trouble was ascribed to *Exoacus theobromæ*, but that seems to contain no mycelium, whereas Went discovered a mycelium in the "brooms" which cause the disease, the external symptoms of which are summed up under three heads[1]:—

(1) The "kruiloten" or "witch-brooms," are hypertrophied branches, thickened, especially at the base, and with a surface roughened by longitudinal corrugations. They are further distinguished by their leaves (of which the stipules persist in a remarkable manner) remaining small and stunted, soft and supple, like the half-opened leaves of the normal branches, and often taking on an unusually dark colour; by the tendency of their axillary buds to give rise to lateral branches before the "krulloot" has attained its full length; by their more or less vertical method of growth; and by their extremely short life (*vie éphémère*), death commencing at the base of the branch. These dead "brooms" constitute a menace to the life of the tree, for they afford easy points of attack for parasites, especially for *Chætodiplodia*.

(2) The hardening (induration) of the pods, a symptom which was not recognized as characteristic until a considerable time after the "krulloten" were admitted to be typical, and was at first identified or confounded with the "blackening of the pods," which is usually attributed to infection by *Phytophthora omnivora*, though the Dutch savants question whether this fungus is the cause of the "blackening" of cacao in Surinam. The "induration" shows itself under three types: in the first the peduncle is hypertrophied; in the second the fruit displays one or two "gibbosities," or swellings, but usually no hypertrophy of the peduncle; in the third the pods exhibit one or two (rarely more) black spots. It is this last form of the disease which has led to the confusion between "hardening" and "blackening." In both cases black spots occur; but in the former the peripheral tissues of the pod are hard, while in the latter they remain soft and brittle. It would appear that in the third type the pods are not so badly infected by the disease as in the other two; for while those with swollen peduncles or with gibbosities always die rapidly and never yield any beans which can be used, the spotted fruits are not necessarily spoiled. Such seeds as they produce are, however, of light weight, and sometimes exhibit a curious tendency to germinate while still in the pod—a phenomenon which is unknown among the normal and healthy beans, If planted out, they give rise to sorry specimens, which is not surprising.

(3) The presence of "star-flowers" (*sterbloesems, fleurs en étoile*). Dr. van Hall and his colleague claim that they were the first to point out these as the symptoms of the disease. The "star-flowers" are borne on fruit-branches which present the same pathological symptoms as the "witch-brooms"—an hypertrophied growth accompanied by an exaggerated development of the lateral ramifications—and they appear as an agglomeration of a large number of flowers inserted in the peduncles, and having among them vegetative branches transformed into little "krulloten." They seldom give rise to ripe pods; the fruit of them is usually malformed and globular and devoid of beans—the "mancacao" (cacao mâle) of the Dutch planters—and sometimes vigorous "witch-brooms" bearing flowers spring from them.

The ill effects of the disease are seen chiefly in the reduced crop. It does not appear that the fungus in question is necessarily fatal to the adult cacao trees, though it is disastrous in the nursery; it is the secondary effects that are to be feared. Thus the "witch brooms" that die off frequently leave cankerous wounds in the bark, and these give the *Chætodiplodia* its opportunity. The profound enfeebling which follows the repeated fall of the leaves due to *Thrips* may also complicate a case of infection by *Colletotrichum*, and lead to fatal results.

Experiments with various manures and different soils gave negative results. One thing, and one thing only, appeared to influence the disease, and that was "the climate, and consequently the seasons." The effect of meteorological conditions is marked; and, as a rule, one may say that abundant rains, and the dampness of air they bring with them, favour the appearance of "witch-brooms." This point is elaborated in detail by the authors, and illustrated graphically; and their results are summed up thus:—

"We have shown that, as a general rule, abundant rains and a humid atmosphere favour the fructification of *Colletotrichum*. It is not necessary to conclude, however, that a very rainy year will produce an increased number of hardened fruits. It is not so much the absolute quantity of rain as the manner in which it is distributed during the year that is decisive; a moderate, regular rainfall, recurring each day, is more favourable (to the disease) than a few very violent downpours alternating with dry and sunny days. Thus the year 1907, for example, with its abnormally abundant rains in April, has not proved so harmful to the cacao as the less rainy year 1906."

The question whether the *Colletotrichum* lives as a parasite on other plants beside the cacao is dismissed in a short paragraph of the monograph. Although abnormal growths similar—sometimes remarkably like—the "witch-brooms" are found on the Bois immortelle (*Erythrina glauca*), on the mango, the sapodilla, and species of *Eugenia* (*chrysophylloides*), in no case do our

[1] From the translation in the *British Guiana Journal*.

authors find that their *Colletotrichum* is the cause of the diseased condition.

L'Agronomie Tropicale says that the question of less shade is acknowledged to be very important as possibly offering one of the chief remedies, and it would seem to be wise not to shade heavily, so as to let excessive dampness escape, and allow light and air to play round the trees. Hamel Smith, points out Mons. de Wildeman in this, the French article, "has just called attention to the question of overshading in his 'Future of Cacao-planting.'"

Manihot Rubber Trees.

PART III.

MANIHOT GLAZIOVII OR CEARÁ.

ACCORDING to the *Hawaii Bulletin*, the Ceará tree is a rapid grower, with a loose spreading and not very leafy top. It usually branches in threes, and these again branch in turn, and so on during the life of the tree. When growing in the open in Hawaii, under favourable conditions, as with the Koloa group (planted about 1894), the trunks of the 14-year-old trees average about 44 in. in circumference at 3 ft. from the ground. The wood is soft and spongy and white. The growth rings are not prominent.

The roots are shallow and not very numerous.[1] They are thick and fleshy and bear elongated, fleshy tubers, very much resembling the roots of the cassava and sweet potato. At the Rubber Exhibition the Ceylon Court had a young tree with tubers attached, the bark of the trunk showing the well-known resemblance to the silver birch. The tree regularly sheds its bark, the outer layer of which is tough and papery. As the new growth of bark forms immediately outside of the cambium layer, the outer bark dries and sloughs or peels off continuously. In the roots the young tubers have a very thin bark, and contain a large percentage of starch. As the tubers grow older the bark thickens, the outer surface becomes woody, and the centre filled with pith and water.

One Bahia writer claims that the Maniçoba does better in a clay soil lightly mixed with sand. The same writer confirms the opinion, expressed by us in Part II., that, whilst the tree can withstand extreme drought, it also takes kindly to well-irrigated land. Increased moisture must, and undoubtedly does encourage the latex flow. Moist air surrounding the tree encourages quicker growth.

One drawback with the Ceará tree seems to be its liability to be broken by the wind. The newly-named species, *M. dichotoma*, &c., do not seem so liable to be thrown down, but then they evidently do not grow to be so tall as the *Glaziovii*. A Brazilian insect (the Cupim) attacks the wood as it does white pine. The Maniçoba (*Glaziovii*) tree attains a height of 30 ft. according to the *Bahia Boletim*, but as others speak of its branching at 25 ft., the total height would, in such a case, probably be at least another 10 ft. to 15 ft. The trunk of the largest tree in the Koloa group—Hawaii—at 14 years old, measured 47 in. at 3 ft. from the ground. Gigantic trees (the *Bahia Boletim* describes them) cannot resist the undermining of the cupim for more than one year. When the first high wind comes they fall, throwing shoots sometimes to the ground, which take root and form new growths. This, however, must, if possible, be guarded against on cultivated lands, because even with less brittle trees the fall of one of the giants always does much damage to its neighbours. Even a large branch breaking away leaves a most undesirable gap at times. Cattle are said to like the young Maniçobas to eat, so that care must be taken to keep them away.

Reports and opinions vary considerably as to the yield obtainable from *Glaziovii*, or as to the age when the tree can be tapped. If those who claim that several pounds per annum are obtainable from Ceará trees are correct, it would look as though circumstances favoured some estates more than others.[1] In such cases those who obtain the smaller and more general yields would be well advised to study the advantages enjoyed by their fellow-planters, and see whether some of them—as increased water supply, or a moister atmosphere, better soil, &c.—cannot be obtained on their own estates.

With regard to the age at which one can start to systematically tap the trees, the general idea seems to be that this can be done from three to five years old. "No two trees are alike," Jared Smith tells you.[2] "For this reason every tree in the plantation should be tested before it is two years old to determine whether it yields a paying quantity of latex. There is no need for waiting four or five years to cut out unproductive trees. The widest variation exists both in the proportion of rubber contained in the latex and in the amount and freedom of flow of the latex itself. The outward appearance of the tree is no indication of its value as a rubber-producer. The latex of some trees is thin and watery. The older the tree the thicker the latex, but there is great difference even among young trees. Trees yielding thin, watery latex without any appreciable amount of rubber, should be cut out and destroyed and their places filled with cuttings taken from trees yielding large quantities of rubber."

Mr. Fawcett, in his translated extracts[3] from the *Boletim de Agricultura*, Bahia, states that whilst the Maniçoba has a rapid growth, principally at the commencement of its development, it is believed that from the fourth to the fifth year it can produce, but the maximum of production is from the eighth year and onwards, as with cacao. That cultivated Ceará in more congenial surroundings can give good rubber-yielding latex at three to five years, as some claim, has not yet been confirmed in print by reliable authorities, but the same bulletin claims that the Maniçoba, the same as the Hevea, increases its yield after repeated tappings. Maniçoba, we are told, is educated in its milk production, in the same way as the breasts of animals are habituated to give the maximum production of milk. During our labours we observed an increase in the milk yield after repeated tappings. The fact is known to all Maniçoba rubber collectors.

The same authority mentions that Ceará seeds constitute a food liked by cattle, and of great alimentary power from the richness of fat materials. They can be ground to produce a rich forage, superior, perhaps, to the flour of the seeds of cotton and other similar seeds.

[1] *Bulletin* No. 16 of the Hawaii Experimental Station.

[1] The above bulletin, we see, on p. 29 speaks of yields of 5 lb. to 10 lb. of crude rubber per tree each year.

[2] Bulletin No. 16 of the Hawaii Experimental Station, already referred to.

[3] *Bulletin of the Department of Agriculture*, Jamaica, February and March, 1908.

Review.

LECTURES ON INDIA-RUBBER, being the official account of the Proceedings of the Conference held in connection with the International Rubber Exhibition, London, September, 1908. Edited by D. Spence, PH.D., F.I.C. Pp. 333, including an exhaustive table of the important brands or trade names of rubber, their geographical and botanical origin, as well as their analytical and technical contents as far as they are known. Price 11s. 6d., post free, from TROPICAL LIFE Publishing Department.

"I think it only right to state," acknowledges the foreword to the Exhibition catalogue, "that this Exhibition was first suggested by Mr. H. Hamel Smith, the Editor of TROPICAL LIFE, who has rendered it every assistance, and his help has been much appreciated by the Executive."

Since, therefore, TROPICAL LIFE orginated the idea of the Exhibition and of the Congress, we feel that indirectly we are responsible for the appearance of the above book, which is a distinct gain to the rubber world. We say this because no book yet published on the subject contains the joint opinion of the practical planter and exploiter of yesterday with forty or fifty years experience and the scientist of to-day who has made up in quality of knowledge what he may lack in length of experience. A glance through the book shows that it bristles with important points, raised and answered by the most practical and scientific authorities, among which we noticed the following:—"Even, in 1884, with prices at 2s.[1] and the cost of production heavier than to-day," claims Mr. H. N. Witt, Special Commissioner for Amazonas, "the rubber crop largely increased, . . . and should rubber prices get very low it is not to be supposed that the Government would allow the hen to be killed by keeping up the present heavy export taxation on rubber. There is a very big margin left, should prices ever drop to 2s. per lb. or less."

"There are several indigenous plants," says Mr. Kelway Bamber, "such as Crotalaria, Mimosa, Desmodiums, &c., which can be grown in many instances in such a dense manner that it is impossible for weeds of any harmful description to grow beneath them. These plants, belonging to *Leguminosæ*, also greatly benefit the soil." "Manufacturers," according to Mr. Herbert Wright, "prefer slow drying for rubber; from the planters' point of view this was not satisfactory." "Some of the planters," the Editor of TROPICAL LIFE pointed out, "had been in much too great a hurry to dry their products (*in vacuo*) . . . yet the fact remained that the first estate to use the vacuum dryer, with care, realized much better prices for its vacuum-dried rubber than for rubber dried by other means." "Experiments have shown," claims Olsson-Seffer in his paper, "that pieces of freshly-coagulated rubber which have been subjected to very high pressure retain all the characteristics of good rubber much longer than pieces not pressed." The practical importance of this observation, adds Dr. Spence in an editorial footnote, should not be overlooked.

Mr. H. A. Wickham[2] finds "it a curious thing and a matter of astonishment that the Pará method of smoke-cure was not taken up in the East . . . this was not the same as treating Hevea with creosote and acetic acid solution . . . the whole effort in the method for fine-cure Pará being to bring a thin film of latex, as pure and fresh as possible, straight from the tree into quick contact with the smoke-jet."[3] "At Dominica," Mr. W. G. Freeman tells us, "during a gale, out of thirty-three Funtumia trees in the Botanic Gardens, only six were left standing, whilst none of the Castilloas were injured. In the Kameruns the Pará rubber trees similarly suffered during a tornado, which left Castilloas but little affected." According to Mr. Nozagary, "the first-class specimens of the *Hevea Brasiliensis* along the Amazon grow only on peculiar clay banks," and further on he claims "that owing to defective treatment the whole of the production of Amazona loses £3,000,000, as well as 5 per cent., as waste in the extracting, collecting, &c., of the latex."

The paper contributed by Mr. J. B. Carruthers, now Assistant Director of Agriculture in Trinidad, W.I., on "Cover Plants *v.* Clean Weeding," is in its way as valuable to the rubber and cacao planter as any in the book. It is worthy of the most careful attention as showing the great saving in fertilizers by the use of *Crotolaria striata* as a green manure, as well as the saving in weeding and the prevention of soil erosion, or its loss by clean weeding.

These are not one per cent. of the facts and statements advanced in the various papers read and in the discussions that followed. They can only serve to give some idea of the class of men who took part in the Conference, but do not give a satisfactorily adequate idea of the great utility to the planter of the practical and scientific information the book contains. To fully ascertain this our readers must secure a copy of the work and study it for themselves. As pointed out in our preliminary notice last month, all the papers have quite lately been revised and brought up to date by the various authors, so that the work is absolutely the last word on rubber. It is undoubtedly a book that will be as useful to turn to for reference in ten and twenty years time as to turn to for information to-day.

[1] After being at 4s. 10½d. per lb. in 1882.

[2] Author of the "Plantation, Cultivation and Curing of Pará India Rubber." (Kegan Paul and Co.) Price 3s. 6d.

[3] This is the principle of the Da Costa coagulating plant.

A Cotton and Fibre Exhibition for London.

INFORMATION is just to hand that an International Cotton and Fibre Exhibition will be held in London in 1912, in conjunction with which an important conference will be held for the purpose of considering the cotton and fibre questions in their various aspects.

The exhibition will be practically comprehensive, as it will include exhibits from the seed right through to the manufactured article. The various processes to which the raw cotton is subjected, such as picking, ginning, baling, &c., and the processes of manufacture will be fully demonstrated.

It is certainly a subject with a great scope, and as a section of the exhibition will be devoted to other fibres, animal, vegetable and mineral, a wonderful display can be anticipated with confidence. Further particulars can be obtained on application to the Editor of this journal.

EVIDENTLY there is money in pigs as well as in rubber trees. If rubber is selling high, so are pigs' bristles. One pound of these go to make up eight bundles, each 1 in. in diameter, and sold as high as 22s. per lb. for 50½ lb. fine long whites at the Public Sales in London on September 2nd.

Notes on Present Condition of the Castilla Rubber Industry.

By Dr. PEHR OLSSON-SEFFER.

PART VI.—AND LAST.

ANOTHER point in connection with this method of preparing rubber I shall now refer to. The Brazilian rubber collector prepares the crude product by dipping a spade-like piece of wood into the latex, and then drying the thin film of latex over the smoke from burning palm nuts. When the film is solid another one is added, and thus the work goes on, until a large ball of rubber has been formed. Each of the succeeding films exerts a certain pressure on the inner parts, and in this fact we have to look for one of the main reasons why so-called hard cure Pará retains its strength so well. Another observation is, that if a piece of crude rubber is surrounded by twine, as in a cricket ball, the rubber remains perfectly sound for years, while if a piece is exposed to the atmosphere and is not subjected to pressure it will in the same period of time lose many of its physical qualities. I attribute the keeping qualities of Pará balls and of the rubber in a cricket ball to the pressure to which it is exposed in either case. Experiments have shown that pieces of freshly coagulated rubber which have been subjected to very high pressure retain all the characteristics of good rubber much longer than pieces not pressed.[1]

It is further important to notice that hard cure Pará rubber is not perfectly dry. Experiments have shown that rubber containing a slight amount of moisture is more "elastic" and has a higher resistency than rubber not containing any moisture. Other experiments have shown that perfectly dry rubber does not keep as long as a rubber containing a certain amount of moisture. On the other hand, if the amount of moisture is too large the rubber is liable to deteriorate, as the moisture assists bacterial organisms in their destructive processes. With these points in view, by the method of drying and pressing rubber employed in the above system of preparation, rubber will be freed from all impurities and from tackiness, as this causes a rapid deterioration, and tacky rubber cannot be depended upon for manufacturing the best qualities of rubber articles.

In regard to *Castilla* rubber it is important that as small a surface as possible be exposed to the atmosphere, as it is very liable to oxidize. From this point of view it is evident that the block form is the most suitable. For shipping purposes the block is also the most handy form.

The development of tackiness in *Castilla* rubber has been studied to some extent at La Zacualpa Laboratory. Many experiments with inoculation of bacteria which cause tackiness have been made, and it has been proved that tackiness can be prevented by the use of one or another disinfectant in the preparation of the crude rubber. Following up the cue given by the method of coagulation employed in the Amazon district, most experimenters first used creosote as an antiseptic in preparing rubber. It had been found that the smoke of the urucuri nuts contained, among other substances, small amounts of creosote, acetic acid, and acetone. My experiments have shown that a great number of different chemicals can be used in asepticizing the latex, but an alcoholic solution of creosote used in small quantities is probably one of the best.

During a visit to Ceylon in the beginning of 1907, I learned of the experiments conducted there in regard to creosoting and blocking "wet rubber." This so-called blocking of "wet rubber" is the same process which for several years past has been practised on a number of plantations in Mexico. An alcoholic solution of creosote has also been used at many places in Mexico for the purpose of preserving the rubber.

According to the official statistics of Mexico for the fiscal year 1906-1907, the export of rubber from that country amounted to 10,321,247 lb., of which only 1,851 lb. were shipped to Great Britain. The total value of the Mexican rubber export was estimated at £667,892, and the value of the export to Great Britain at £257. It is, therefore, not correct to take London market reports as a guide in judging the Mexican rubber industry. Besides this 1,571,225 lb. of guayule were exported in a crude state from Mexico. By far the greatest part of the rubber exported from Mexico goes to the United States. Germany takes a large portion, and France, Spain, and Belgium import large quantities of Mexican rubber. The official statistics do not yet show to what extent plantation rubber figures in the export, but inquiries have shown that 470,000 lb. of rubber were obtained from cultivated trees during the year in question. This amount was increased by some 135,000 lb. during the year 1907-1908. It is estimated that the plantation rubber during the present season will reach the figure of 800,000 lb. from Mexico, all consisting of *Castilla* rubber.

While the British rubber-investing public has of late years been very sceptical in regard to Mexican rubber, the above figures should demonstrate that the industry is going ahead in this country with great strides. And if handled rightly, rubber-growing in Mexico is a safe and profitable undertaking, comparing favourably with planting in other countries.

[1] Hence the advantage of using blocking presses.

Rubber Shares.

MESSRS. RUSSELL, GRANT AND Co. reported on September 9th that the market for Malay and Ceylon Rubber Company's shares, in spite of the settlement, had been very active, and prices all round remained very firm.

From other sources we learn that brokers anticipate an increasing amount of business as the holiday season wanes and the time for big dividend declarations draws near, especially as there seems no particular reason to look for a fall of any importance in the price of rubber for some time to come.

Comparative prices with last month rule as follows:—

	September 9th	August 12th
Bukit Rajah	$8\frac{1}{8}$ to $8\frac{3}{8}$	8 to $8\frac{1}{4}$
Cicely Estates Co. (Ord.) ..	$9\frac{3}{4}$ to 10	$9\frac{1}{2}$ to $9\frac{3}{4}$
Highlands and Lowlands ..	$2\frac{1}{4}$ to $2\frac{3}{8}$	$2\frac{1}{8}$ to $2\frac{1}{4}$ p.
Klanang Produce Co. ..	$5\frac{1}{4}$ to $5\frac{3}{8}$	5 to $5\frac{1}{4}$
Lanadron Estates	$4\frac{7}{8}$ to $5\frac{1}{8}$	$4\frac{1}{2}$ to $4\frac{3}{4}$
Linggi Plantations (2/- paid)	22/9 to 23/3	21/6 to 22/-
Perak Rubber Co.	$2\frac{7}{8}$ to 3	$2\frac{3}{4}$ to $2\frac{7}{8}$
Selangor Rubber Co. (2/- paid)	33/- to 34/-	31/6 to 32/9
Shelford Rubber Co. ..	28/9 to 30/-	27/- to 28/-
United Serdang Rubber Co.	$3\frac{3}{16}$ to $3\frac{5}{16}$	$3\frac{1}{8}$ to $3\frac{1}{4}$
Vallambrosa Rubber Co. ..	21/6 to 22/-	21/3 to 21/9

p. = premium.

Prices quoted in previous issues should be compared with above.

The Utilization of Surplus Bananas on the Estate.

THE increased areas put down under bananas year by year and the growing tendency for them to be increased must cause the planter to give fuller consideration to what are generally considered the smaller issues in connection with this work. It is impossible to doubt that, in common with all other important industries, the question of bye products or waste material on the banana plantation will take a prominent place in the near future, and it is almost equally certain that the planter will find, as manufacturers have heretofore, an increased source of profit in this direction.

To the owner of an estate producing bananas only, without companion crops, this matter is likely to assume serious proportions in the immediate future. One has only to consider the fresh areas constantly being placed under cultivation to realize the truth of this. Colombia is among the last to send fruit over for sale on this side, but other centres also are either considering the planting of new estates or are already beginning to ship the fruit to Europe and the States.

When these new centres, of which Surinam and German West Africa are perhaps good examples, come into full bearing, the older producing districts like Jamaica, the Canaries, Costa Rica, &c., cannot expect that prices will rule quite so steadily as they have done up to the present.

The time is consequently at hand when "the house must be put in order" to meet the new competition, and, with the transport side of the business so highly developed as at present, the only side for development seems to lie in the utilization of the surplus fruit and the production of manufactured articles from the fruit on the estate itself.

It is here that an outlet can be found for the bunches too small to be shipped or for the fruit which is too ripe to export with safety. Planters who agree with our statement of the position will be interested to hear that there are two processes for drying bananas which are already in use, and which are producing a marketable article of high value and increasing demand.

Of these two processes the one takes the green banana and produces from this a dry meal for baking purposes, embodying all the well-known nutritious properties in a high degree, together with a highly pleasing distinctive flavour, which forms an additional attraction to the consumer. The other process deals with the ripe banana and produces the "fig" banana. This latter article seems to be making very rapid progress in favour of the public, which is perhaps not to be wondered at in view of its extreme utility to the confectioner. Instead of the continual purchase of small quantities of fruit associated with an element of luck as regards the full flavour which he desires, the confectioner has with this dried fruit a stock article which may be stored for practically any length of time, independent of the seasons, and which possesses the full flavour of the mature fruit ripened under its natural conditions. We are informed that 100 kilos of whole fruit gives about 65 kilos of peeled fruit, which in its turn gives about 20 kilos of machine-dried meal.

The so-called "fig bananas" are usually sold by number, in the retail business at least, and one or two dozen are usually packed in paper-lined cardboard boxes.

The process of drying is, we understand, an extremely simple one, and applies equally to the meal or the fig product. Naturally the drying is not carried quite so far in the latter case as in the former. It is usual also to split the green fruit for meal drying in order to produce a more uniform product.

The most suitable apparatus for this work is the Vacuum Drying Apparatus, formerly described in these pages in connection with rubber and cacao plantation work. (This fact will have interest to those who grow either of these crops in addition to the banana, for the one apparatus could possibly be made to serve for all three products in turn.) This stove consists of a massive iron chamber fitted with a movable door and steam-heated shelves. When the door is in place the chamber is hermetically sealed. The interior of the stove is exhausted by a high-efficiency vacuum pump, in connection with which there should be a surface-condenser and water-receiver. The exhaustion of the chamber (or the vacuum) is for the purpose of lowering the temperature at which the material dries (this being about half that of an ordinary air-stove), while the rate of drying is much increased. The natural flavour and colour of the fruit is thus to a very large extent retained, while the working economy of the apparatus is obvious. It also has an advantage over the air drier, in that it is much more compact.

We shall be pleased to go into the matter of thus utilizing surplus bananas in the way proposed, and to answer any enquiries which our readers care to put to us on the matter. To do so properly, however, full particulars must be sent as to the quantity to be dried at a time, whether meal or dried bananas only are required, &c. We point this out as we often find that those who wish to have the fullest details give the least information on which to build up the estimate. This can only result in a waste of time, or, worse still, may cause the makers of the apparatus, through no fault of their own, to send out a plant that might not be altogether suitable for the exact conditions, and thus cause the process to fall into disrepute.

THE tendency of to-day, the *Louisiana Planter* tells us, is towards disintegration and the breaking up of the very large sugar plantations. This is due to the difficulty in obtaining the necessary labour. The *Louisiana Planter* mentions the case of the Adeline Sugar Co., Ltd., which is making arrangements to sell some 6,000 acres, in 50- and 100-acre lots, at about $65 an acre, of cleared land, according to quality. Purchasers after paying 10 or 20 per cent. deposit, will be given a number of years in which to pay off the balance.

ONE of our readers writes: "DEAR SIR,—We have an enquiry for a pulping machine for coffee. We shall be glad if you can give us the name of the makers of this type of machine, when we will put them in direct communication with our friends." We at once referred our friends to Mr. Stamm, the agent for Messrs. Krupp's coffee pulping machine. In answer to an enquiry for a maize huller, we gave the name of Messrs. Ph. Mayfarth and Co., who make a very useful machine for this purpose.

"Tropical Life" Friend.—No. 51.

DR. J. SACK.

Analyst to the Experimental Station, Paramaribo, Surinam.

ALTHOUGH still a young man—having been born in 1876—Dr. Sack has already made a name for himself in the tropical world, especially among the scientists. Of late especially, owing to the excellent work of "Our Friend," in connection with Dr. van Hall, the Director of Agriculture (see TROPICAL LIFE, March, 1908), to exterminate the witch-broom disease in Surinam, Dr. Sack's name has become a well-known one among cacao-planters and others.

First trained at the excellent School of Agriculture that Wageningen can boast of, Dr. Sack afterwards attended the University in Göttingen, where he took his Ph.D. degree, after which he served for two years and a half as assistant to our old friend Dr. Greshoff (see TROPICAL LIFE, March, 1906), who is Director of the Colonial Museum in Harlem. There Dr. Sack was thoroughly trained in, and helped to carry on, a long series of analytical experiments, some of a highly technical character, in connection with the many samples of products, mainly tropical, sent up to the Museum for examination and report. This gave "Our Friend" a splendid opportunity, which he highly appreciated and availed himself of to the utmost, of becoming closely acquainted with colonial and tropical products, their likes and dislikes, and the diseases and pests that attack them. Following this, Dr. Sack served as private assistant to Professor van Romburgh in Utrecht for six months. He was thus well trained for, and fully capable of filling, the post of analyst attached to the newly-founded Experimental Station that had been established in Surinam in 1903 mainly to fight the dreaded witch-broom disease that had played such havoc on what were formerly flourishing cacao estates in that well-known Dutch colony, having reduced the exports by 75 per cent.

Our article published this month under the heading of "Cacao Cultivation, No. xvii.," gives some idea of the work that Drs. van Hall and Sack had done up to the time that the report on which these notes are based was published. Since then the benefits of the work they have done have been even more apparent. New York, for instance, imported 14,000 bags of Surinam cacao last year, against only 7,500 bags in 1904, when the disease was at its worst; and the total exports for 1908 were 1,405,343 kilos., against only 854,034 kilos. in 1904. Full reports of the work done from the start in 1903 up to the end of this year will, we hope, be published, and in English as well as Dutch, since Dr. Sack and his fellow-scientists are all excellent English scholars. Various reports and bulletins on the matter have already appeared, and can be seen in the columns of many of our contemporaries, but a complete report has still to come.

Dr. Sack, as many of our readers are aware, is much interested in the question of the fermentation of Cacao, and one day we hope to see an authoritative statement from him on the subject. "Our Friend" considers that Mr. Oscar Loew's article on "The Fermentation of Cacao and of Coffee" to be one of the best yet published on the subject; at the same time there is still much to be done before the subject is thoroughly exhausted.

The Coming Exhibition of Rubber and Tropical Produce at Manaos.

AN Agricultural, Industrial, and Commercial Exhibition will be held during February next year at Manaos, under the patronage of the leading officials of the various States. The Exhibition will be organized by, and under the auspicies of the Commercial Association of Manaos. Special attention will be devoted to Rubber, but other tropical products will play a leading part both in the Exhibition and at the Conference, which, as in the case of our own Rubber Exhibition, will be held at the same time. At this Conference papers will be read and discussed on Rubber, Coffee, Cacao, Sugar, and other leading tropical products. The double attraction of the Exhibition and the Conference will draw the leading men in the tropical agricultural and commercial world to Manaos, for anyone fortunate enough to be able to attend will be only too pleased to do so.

We understand also that four prizes of milreis 5,000 each (about £335) will be offered for the best essays on the following subjects:—

(1) The best means of facilitating and encouraging the navigation of the Amazon.

(2) The best means of populating or of attracting settlers to the Amazon.

(3) Can agriculture be carried on to pay in the Valley of the Amazon? If so, which regions will be the most adaptable for that purpose, and how can such an industry be carried on without prejudice to the present industries carried on there?

(4) What would be the advantage of cultivating rubber along the Amazonas Valley, and which centres would be best for laying out such plantations?

Further particulars can be obtained on application to the Editor of TROPICAL LIFE.

ACCORDING to experiments carried out by the Commissioner of Fisheries at Ballygunge, Calcutta, the best method of preserving fish for the Tropics is to first pickle them, and then smoke them over a wood fire for twenty-four hours.

Business Notices.

1.—The address of TROPICAL LIFE is Messrs. BALE, SONS AND DANIELSSON, Ltd., 83-91, Great Titchfield Street, London, W.

2.—All **literary communications** should be addressed **to the Editor,** and accompanied by the necessary stamps for their return if not accepted.

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7.—Non-receipt of copies of the Journal should be notified to the Publishers.

8.—The Journal will be issued on or about the twentieth of the month.

Tropical Life.

SEPTEMBER, 1909.

How Trinidad is Fighting Cacao Pests.

THE NECESSITY OF HAVING AT LEAST ONE SPRAYING MACHINE ON EVERY ESTATE.

WE congratulate Professor Carmody (the newly-elected Director of Agriculture in Trinidad) and his staff on the determined fight that they are carrying on, not only to overcome the insect pests that do so much to ruin the cacao crops, but also to overcome the apathy and negligence of the human pests, whose indifference causes quite as much damage and loss. We wish them every success in their campaign, and hope to see their example followed by others.

In the *Trinidad Bulletin*, issued in its new guise, and forming No. 63 (New Series), for July, we see the following steps have been taken, and hope that we may have helped in some degree to bring this about.

Those who have read "The Future of Cacao Planting"[1] will be interested to know that on the San Carlos Estate in the Guanapo district, as an experiment in growing cacao without shade, the shade has been removed from 500 trees about 8 to 9 years old. The trees look quite healthy, and are reported to have given as satisfactory yields as the neighbouring trees, so much so that Mr. Stollmeyer, the owner of the estate, has already ringed shade trees covering 4,500 cacao trees, and intends removing the shade from the whole estate of 50,000 trees.[2] Furthermore, adds Professor Carmody, if the practice of manuring cacao becomes general, the question of retaining shade trees, which will absorb a large part of the manures added, will have to be considered from that point of view.

The *Tropical Agriculturist* of Ceylon is quoted to show the advantages of reducing the quantity of shade, and of spraying regularly. "Since 1902," the *Tropical Agriculturist* tells us, "we have gone in for cutting out excessive shade, excising cankered tissue, and *spraying the pods during crop time*, with the following results:—

Month	Diseased pods, first year	Diseased pods, second year
July	60 per cent.	.. 4 per cent.
August	62 ,,	.. 3 ,,
September ..	60 ,,	.. 13·5* ,,
October	34 ,,	.. 22·8* ,,
November ..	28 ,,	.. 9·3 ,,

* Increase due to excessive rainfall.

"During the third year, the fungus pods varied from ·7 to 1·2 per cent., and the number of diseased trees on the different plots varies from 1 to 10 per cent. The desire to take up spraying is evidently a growing one.

"Disease and neglect caused one man to get only nine bags of cacao from 4,000 trees, and others in the neighbourhood seemed as bad, whilst other instances are given where 1,000 trees on a small plot gave, with care and attention, twenty-five bags, and another gave thirty bags, and 30,000 cacao trees gave 600 bags, or twenty bags of 165 lb. per 1,000 trees. The agricultural inspectors report that their suggestions have been favourably received, even by the small proprietors. This we are glad to see, as it should encourage makers of spraying-machines to persevere in their efforts to push the use of machines. There is very little doubt from all accounts that 'a day will come' when with patience the sale of machines will increase. The planters, down to the smallest, are willing to buy, once they are shown how to use them, and the advantages of spraying. Agricultural instructors throughout the Island are doing their utmost to show this, so the day cannot be far distant when the sale of spraying machines will be general, especially as in Trinidad the services of the well-trained staff working under Professor Carmody are offered free of cost to the planters and small growers, who are not slow to avail themselves of the experience they thus gain. The great point evidently that has to be driven home to the planter is, that it is not sufficient to merely tar *over* the cankered spot (most of the mischief in Trinidad is due to canker). That only hides the mischief, it does not cure it, and the disease goes on spreading underneath the tar.

"Although Bordeaux mixture is an excellent preventive of a certain class of plant diseases," reports Mr. Birch Rorer, the Mycologist attached to the Trinidad Department, "and has been highly recommended for the control of various cacao troubles, no properly conducted experiments with it or other fungicides have been carried out in Trinidad. Without definite knowledge based upon such experiments it is unwise to recommend spraying to the general planter. In order to obtain accurate results upon which to base recommendations for the use of fungicides, I would like to carry out such experiments. . . . These should continue for one year or, better, two years . . . . and no results are to be published, except at the discretion of the Entomologist or Mycologist, until they have been carried out for at least one year."

Here, then, is the chance of their lifetime that those with fungicides and insecticides to sell have of proving their utility or their weakness. No matter how good the fluid or mixture may be, their utility can doubtless be enhanced by such experiments, carried on by skilled hands. No matter how disappointing, on the other hand, an insecticide may have turned out in the past, the lessons to be learnt by collaborating and assisting in such a series of experiments, as far as one can be allowed to do so by supplying samples of fluid, the most adaptable spraying machine, &c., should, and probably will, enable the makers of insecticides and fungicides to alter their formulæ, until a thoroughly reliable and efficacious fluid results. Upon the completion of the experiments,

[1] Published by TROPICAL LIFE. Price 1s. 2d. post free.

[2] "In warm, moist, and shady equatorial forests the very leaves on the trees get covered with beautiful lichens and hepaticæ."—Richard Spruce in "Notes of a Botanist."

Mr. Rorer tells us, the effect of the use of the various insecticides used upon the trees, as well as the results obtained in the control of insect pests, will be reported on, while the general spraying operations, mixing plant, apparatus, and methods of mixing fungicides will be described.

If each of the many centres where cacao, coco-nut, and other diseases seem to be so rife, and are increasing in extent, would follow the excellent example now set by Trinidad, or at least by the Agricultural Department of Trinidad, we should hear much less of the losses caused by die-back, canker, &c., for once the disease is kept within bounds, its final extermination is only a matter of time, patience, and perseverance as regards spraying.

Professor Carmody has always shown great interest in our efforts to encourage pest-extermination, and promised to give any machine recommended to his notice by us his careful consideration.

Let us describe what Trinidad is doing to push the use of sprayers and spraying fluids. Mr. Rorer proposed to take a block of 800 cacao trees in good bearing, located in a district where diseases are prevalent. These will be divided into thirty-six plots of twenty trees each, which will be sprayed according to the schedule below, whilst four plots, each twenty trees, will be left unsprayed as checks of the thirty-six plots :—

Plots 1 to 6 are to be sprayed with Bordeaux mixture, 4-4-50.

Plots 7 to 12, with Bordeaux mixture, 4-4-50 × 2 lb. arsenate of lead.

Plots 13 to 18, self-boiled lime sulphur, 20-20-100.

Plots 19 to 24, commercial lime sulphur, 1-30.

Plots 25 to 30, arsenate of lead and lime, 2-2-50.

Plots 31 to 36, contact insecticide.

In each case the six different plots will be sprayed at varying intervals, viz. :—No. 1 every two weeks, No. 2 every three weeks, No. 3 every four weeks, No. 4 every five weeks, No. 5 every six weeks, No. 6 every eight weeks.

By these means it will be possible to test the effect on a commercial basis, to show the increase in the crop picked, and to note the exact cost of the various sprayings as well as the benefits and injuries occasioned to the trees.

Elsewhere in the Guanapo district a solid block of 1,000 trees will be sprayed with Bordeaux mixture, and compared with 1,000 trees not sprayed, and elsewhere 8,000 trees are to be treated in the same way. As the cost of spraying is so small, the experiments may also be conducted on a large scale, say in blocks of 10,000 to 12,000 trees, the yield from which has been known for some years previous. The number of shade trees will also be noted and recorded to see to what extent the shade encourages disease, for in face of the success in Ceylon reported by the *Tropical Agriculturist* (as shown on the previous page), it is felt that too much attention cannot be given to overshading. In the "Future of Cacao Planting" it is shown with what advantage to the crops the number of shade trees has been reduced in Grenada. As Dr. Willis, Director of Agriculture in Ceylon, points out in his "Agriculture in the Tropics," the large horse and steam sprayers employed in California and elsewhere have not yet come into use in the Tropics. On cacao estates, at least, these larger sprayers have room to move about between the trees, and on the larger estates it is only a matter of time, we hope, before they will be adopted, whilst the very hilly or uneven portions of the estates can be worked by means of knapsack sprayers, supplied from the larger receptacles down on the flat lands.

Many planters, as is again pointed out in the "Future of Cacao Planting," or at least many labourers on the estates, seem to think that, when spraying, the one object to aim at is to empty the receptacle containing the fluid as speedily as possible. This, of course, can greatly add to the cost, can easily double and treble it, and tends to greatly prejudice the planter, on whom the cost falls, against spraying the trees. Planters cannot guard themselves too carefully against the possibility of such waste, especially as it often leads to some trees getting more than their share or than is good for them, whilst others get little or none at all. The great art in spraying is first to secure the proper fluid and right make of machine, and then to see that they are used in the right way.

Fertilize for your Stock as well as for Crops.

LAST month, at the invitation of Dr. Bernard Dyer, the well-known analyst, we had the pleasure of visiting the Experimental Farm at Hadlow, Kent, where experiments are conducted on behalf of the Permanent Nitrate Committee by Dr. Dyer and Mr. F. W. E. Shrivell, in order to see the advantages of using artificial manures, and especially the nitrogenous ones in the shape of nitrate of soda, nitrate of lime, calcium cyanamide (nitrogen from the air), and sulphate of ammonia, in growing vegetables, fruit, fodder, cereals, and hops. The various plots shown had each received the same manures for sixteen years, during which period, whilst the crop produced may or may not have been varied, the manures used and the general treatment throughout this period had been exactly the same. Besides such plots were two others, one that had only received stable manure or London dung, and a second that had never been manured at all. The visitors could therefore see at a glance the advantages of even the more primitive methods of applying plant food to the soil, whilst the gain from a judicious and scientific application of reliable fertilizers and artificial manures was markedly apparent. Throughout the experimental plots full credit was given to the advantage, and often the necessity, of using potash, phosphates, &c., in conjunction with nitrogenous manures. The exact proportions to be used, together with a carefully drawn up analysis of the original soil (an exceptionally poor one) was shown on the boards attached to each plot, or in the books handed round to the visitors.

We were particularly struck with the improvement shown by using nitrogenous manures when raising alfalfa, hay, and root crops, for stock feeding. The improvement was noticeable both in the increased quantity cropped as well as in the improved quality of the fodder as regards nourishment, and was obtained as a rule at a decreased cost. A large number of stock-raisers were present, and even those who were sceptical at first agreed that nitrogenous manures, judiciously used in connection with phosphates, potash, &c., are worthy of the closest attention of cattle breeders throughout the Argentine and Latin America, Jamaica, Australia, &c., as well as of the ordinary planter feeding his animals to improve the quality of the manure that they leave on the ground.

We should therefore strongly recommend our friends interested in the raising of cattle-food, as well as cereals,

to pay the Committee's Experimental Farm a visit. It is near to Tonbridge, within an hour's pleasant journey by train through some very pretty country, and the manager of the farm, Mr. F. W. Shrivell, is always glad to show visitors round at any time. The results of sixteen years experiment cannot fail to convince even the most sceptical of the value of a judicious use of artificial manures,

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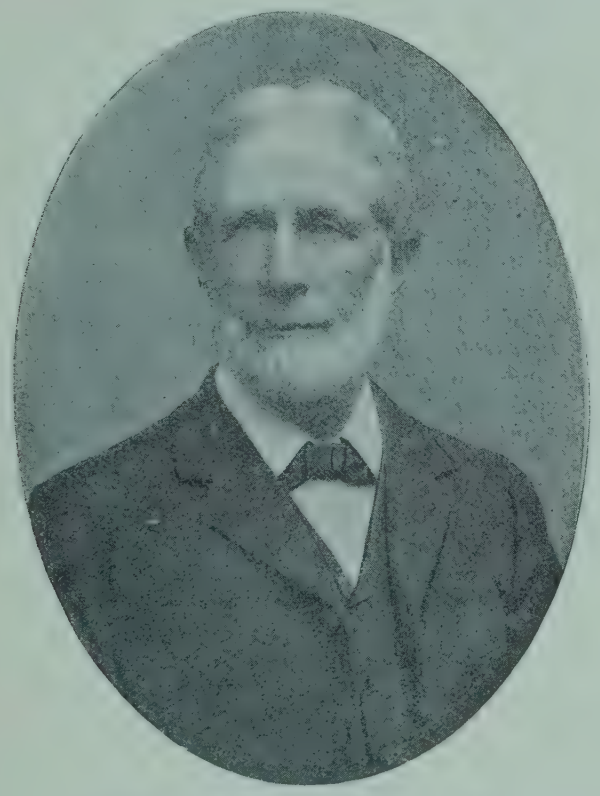
Reviews.

The Journal of the Cooper Research Laboratory. Edited by the Director, Walter E. Collinge, M.Sc., F.L.S., F.E.S. Published at the Laboratory, Berkhamsted.

It is some two or three years since we had the pleasure of making the acquaintance of Mr. Collinge, who was then attached to Birmingham University. In answer to a letter, he very kindly called at our office to see what could be done to stem the rising tide of loss that the Nectria was annually causing to cacao-planters generally, but especially in Ceylon and Trinidad. Since then we have published several articles on the matter, and made an important point of it in "The Future of Cacao-Planting," and are pleased to see that the planters generally are beginning to move, if somwhat slowly, in the matter.



Sir Richard Cooper, Bart.
President of the Cooper Research Laboratory.

The Cooper Research Laboratory was founded to advise and report on all matters relating to plant diseases and pests, and to carry out experiments to ascertain the value of different insecticides and fungicides for destroying them. It also carries out investigations upon the life-histories of various insects, parasites, &c., hitherto not known, or only imperfectly, as well as conferring with and advising agricultural bodies upon subjects relating to economic biology, agricultural chemistry, and bacteriology. A large proportion of the time of the staff is spent in investigating and answering queries about useful and injurious animals and fungi, animal parasites and diseases, and often in issuing detailed reports about the results of their investigations. We have always found Mr. Collinge and his colleagues ready to answer our queries. Readers of Tropical Life, from every quarter—tropical, sub-tropical, or temperate—can also apply to them for information. All that is asked is, when possible, to send specimens of the plants or fruits, &c., injured, as well as the organisms (*living*, if possible, but failing this, dead ones are better than none at all) that are causing the trouble. In the case of insects and mites, adult (mature) specimens are best, but any stage will do; specimens of all stages will be most satisfactory. All specimens should be sent in a tin or wooden box, and air-holes are not needed. Of course, all those wishing to take advantage of the Laboratory's offer of assistance must write a letter giving full particulars of the trouble. This should be sent under separate cover from the specimens, though it is as well to send a rough outline of the case with the specimens as well.

We have consulted the Laboratory about cacao diseases in Fiji, Samoa, Trinidad, Ceylon, &c., and our Samoan friends wrote us only the other day that they found the remedy suggested so efficacious that they had sent to Sydney (New South Wales) for a second lot.

Those interested in agricultural stock-raising and dairying industries would be well advised to write to the Director, Cooper Research Laboratory, Berkhamsted, England, for a copy of the report.

Spon's Workshop Receipts, Vol. II. (including Dyeing, Japanning). All receipts new and thoroughly revised, 533 pp. + xi. of Index, with 259 Illustrations. Price 3s. net. E. and F. N. Spon, Ltd., 57, Haymarket, London, or Spon and Chamberlain, 123, Liberty Street, New York, U.S.A.

This, the second volume of the series, the first of which we reviewed in our April issue (p. 58), contains many items of interest to those trading and living in the Tropics. Our old friend, Mr. Donkin, gives a full account of his excellent system of making earth closets an advantage and a use, instead of a danger and a nuisance. India-rubber receives the attention such a prominent industry deserves. Receipts for dyes and dyeing, cleaning gloves and materials, will also be found of great use by those up country who have to attend to such matters, *chez eux*. Electricity, explosives, inks, hydraulics, glue, glazing, and window-making, gilding, water supply by fountains, heating and drying, all appear to be matters that come within the scope of utility to our readers.

Insect Pests.—More Demand for Preventatives.

The San Thomé folks are following our advice and paying more attention to their trees, one firm sending a repeat order, this time for a gross, of the cacao-tree scrubbers which our Editor designed to use with a bamboo, for the upper part of the trees that cannot be reached from the ground. All round, therefore, we have reason to congratulate ourselves, and those who have worked with us on the interest that we have stimulated in this war against insect pests as well as on the progress being made.

With Tropical Life Friend for August, Professor Simpson, we neglected to state that we were indebted to Messrs. Elliott and Fry for the excellent portrait with which we headed our sketch.

Cotton.

THE following were the prices for Cotton in London on September 10th, according to Messrs. Slann and Davies:—

	Good Fair.	Good.	Fine.	Superfine.	Good 1909.	Good 1908.	Compare
	d. d.	d. d.	d. d.	d.	d. d.	d. d.	
Surat kinds * ...	$5\frac{3}{16}$ to $5\frac{15}{32}$	$5\frac{7}{16}$ to 6	$5\frac{11}{16}$ to $6\frac{5}{16}$	—	$4\frac{3}{8}$ to $4\frac{11}{16}$	$4\frac{15}{16}$ to 6	per lb.
Madras	$5\frac{11}{16}$ to $5\frac{13}{16}$	$5\frac{3}{16}$ to $6\frac{1}{16}$	—	—	$3\frac{3}{4}$ to $4\frac{3}{4}$	$4\frac{13}{16}$ to $5\frac{15}{16}$	—
Bengal	—	5	$5\frac{1}{4}$	$5\frac{3}{8}$	$3\frac{7}{16}$	$3\frac{15}{16}$	—
Assam	—	$5\frac{1}{4}$	7	$7\frac{3}{4}$	$4\frac{1}{2}$	$5\frac{1}{4}$	—
China	—	$5\frac{3}{8}$	$5\frac{7}{8}$	$6\frac{1}{8}$	$4\frac{1}{2}$	$5\frac{1}{8}$	—
West Indian ...	$5\frac{5}{8}$	$6\frac{1}{8}$	$6\frac{3}{4}$	$7\frac{1}{2}$	6	$8\frac{1}{4}$	—
Sea Island ...	$7\frac{1}{2}$	$9\frac{3}{4}$	14	17	$9\frac{1}{2}$	14	—
Australia	7	$7\frac{3}{8}$	—	—	6	$8\frac{1}{8}$	—

* Liverpool quotations.

The first Ginners' Report of the American crop this season gives 377,552 bales ginned to September 1st, against 402,229 bales last year at the same time, but it is too early yet to draw any conclusions as to the probable crop from these figures. The demand for Spot Cotton in Liverpool shows distinct improvement, and "Middling" is raised to 6·95d., being 12 points dearer. "Future" deliveries, after some fluctuations, close unchanged to 3 points higher. Manchester reports a continued good enquiry for goods, and a fair business was put through. Shippers' quotations for East Indian are very irregular, and whilst business is still difficult, there is rather more doing this week.

The import into Liverpool this week amounts to 19,320 bales; since September 1st, 22,404, same week last year 11,572, last year's total 16,142 bales. The estimated Sales amount to 85,000 bales. Middling American is quoted at 6·95d. per lb.; last year, 5·48d.; 1907, 7·19d.

The latest quotations of Americans for delivery, basis middling, any port, G.O.C., were:—

	September 9th.	Last Week.	Last Year.
	d.	d.	d.
September	$6{\cdot}69\frac{1}{2}$	$6{\cdot}67$	$5{\cdot}11\frac{1}{2}$
Sept.—Oct.	$6{\cdot}61\frac{1}{2}$	$6{\cdot}61\frac{1}{2}$	$4{\cdot}92\frac{1}{2}$
Oct.—Nov.	6·60	6·60	$4{\cdot}86\frac{1}{2}$

Movement of American Cotton since September 1st:—

	1909-10.	1908-9.	1907-8.
Brought into sight	—	—	—
Exports from United States since September 1st—			
To Great Britain	5,000	4,000	8,700
To Continent, &c.	21,000	46,000	19,100
Total crop	—	11,571,966	13,510,982

Coffee.

By Messrs. C. M. AND C. WOODHOUSE.

THE market on the spot is still without any feature of interest, and transactions have been small and unimportant. Public sales were held on three occasions, when there was only a languid demand, but prices showed little or no alteration. The stocks in Europe on August 31st, according to Messrs. Düüring and Zoon's usual monthly statement, show an increase on the month of 147,000 bags, against a decrease of 334,000 bags during the same period last year. The total is now 7,632,000 bags, against 7,485,000 bags last month, and 8,512,000 bags last year. The visible supply shows an increase for the month of 1,403,000 bags, against an increase of 586,000 bags same time last year, the total being 15,193,000 against 13,790,000 bags last month, and 14,941,000 bags on August 31st, 1908, showing now a relative surplus of 252,000 bags instead of previously a deficiency. Futures have shown rather more animation than of late, and prices have advanced about 6d. per cwt. during the past week. We quote:—

		1909. To-day.	Sept. 2nd.
London ..	Santos, Dec. delivery.	30s. 3d.	29s. 9d.
New York ..	No. 7 Rio ,,	5·35 cents	5·25 cents.
Hamburg ..	Santos ,,	31 pf.	30 pf.
Havre ..	Santos ,,	$39\frac{1}{2}$ francs	$39\frac{1}{4}$ francs.

The receipts at Rio and Santos from July 1st to September 8th, 1909, were 4,971,000 bags, against 3,357,000 bags and 2,422,000 bags in the two previous seasons respectively.

Sales include the following, viz.:—

Jamaica.—44 bags and 38 barrels at 33s. 6d. to 35s. 6d. for small common brown, 58s. 6d. to 51s. 6d. for low middling green, 52s. for coloury bold.

Guatemala.—220 bags, at 45s. to 46s. 6d. for smalls, 53s. to 54s. for middling, 62s. 6d. to 63s. for bold.

Vera Paz.—335 bags, at 43s. for small common green, 52s. to 60s. for low middling to middling, 56s. to 66s. 6d. for coloury to good bold.

Nicaragua.—115 bags at 50s. to 50s. 6d. for bold palish.

Salvador.—74 bags, at 35s. for ordinary greenish, 40s. to 46s. for good ordinary to fine ordinary.

Mexican.—72 bags, at 45s. 6d. for fine ordinary, 53s. for coloury bold.

Colombian, &c.—700 bags, at 43s. to 46s. 6d. for good ordinary to fine ordinary, 48s. to 51s. 6d. for low middling to middling, 53s. to 57s. 6d. for bold.

Ecuador.—39 bags, at 40s. for bold palish.

Nyasaland.—106 bags, at 36s. 6d. to 44s. for smalls, 41s. to 43s. for ordinary, 49s. to 50s. 6d. for low middling to middling, 54s. to 57s. 6d. for bold.

Brazil,—Unwashed Dumont Santos, 200 bags, at 42s. 9d. to 45s. 6d. for small to medium, 47s. to 50s. 6d. for bold to extra bold. Washed Santos, 22 bags, at 42s. 6d. for small coloury, and 47s. 6d. for middling.

Sugar.

Mr. C. Czarnikow, writing on September 9th, reported that though the weather had slightly changed for the better, buyers still predominate, after pushing the May quotation up from 10s. 8¾d. to 11s. 1d., whilst old crop advanced only from 11s. 8¾d. to 11s. 10½d., New York moving from 4·14 to 4·20 cents. The crop reports show that the roots remain backward, and may be unable to make more weekly progress than in 1908, when September and first half October were seasonable and normal, want of moisture in Germany and Austria, as shown by smaller roots, being set off by exceptional quality. But this year the roots are still smaller, the German-Austrian factories showing about 280 to 300 grammes, against 330 to 380 grammes, and in France, Belgium, Holland, where weights last year were normal, the difference is more marked still, to which must be added the probable inferiority of quality. But all this is a question of September-October weather, which are the determining months for crop results, and if we did get a few extra weeks of vegetation (which was stopped in the third week of October) part of the delay might be made good. At present it seems doubtful whether Germany, in spite of larger sowings, will produce the same quantity of sugar, and whether 12 to 15 per cent. increase of area in France, Belgium and Holland will more than cover the Austrian deficiency, whilst Russia may export less. We may, of course, temporarily see American granulated and Cuban sugar here, and we can make efforts to attract much more Java sugar for next August-September arrival in the United Kingdom, but in January-July the total foreign imports in America were 26,000 out of 1,482,000 tons, therefore during that period not much extra cane can be forced to Europe, and European supplies may for a long time look rather small, even if we export less to India, &c. However, what interests the trade much more just now is the quantity of October beet which may be wanted from here for New York. Three weeks ago we calculated August-September meltings at 400,000 against 333,000 tons, but the August meltings are 233,000 tons, and with another 200,000 tons in September our estimate will be exceeded, though the fruit crop is not as good as last year. But in October-December it is rumoured that meltings may be only 400,000 against 513,000 tons, with more Brazils and Louisianas arriving in New York than even we had calculated, and Cuba beginning to work much earlier. We have had similar reports before, but all available sugars will be wanted, because though our estimate of 70,000 tons August-September Javas seems correct, the Javas due in October-November are less than 100,000 tons. It is just possible, too, that we may be able to do without American orders if we should not get very fine weather.

Reports from India are generally good about all crops, and in such seasons consumption is usually stimulated. Sugar reports are still incomplete and entirely subject to future weather, and they vary rather considerably, as detailed estimates in the Province of Bengal vary on basis of 100 per cent. for normal yield from 54 to 105, against 40 to 100 last year.

American refiners had to raise their prices from 4·14 to 4·20 cents. = 11s. 6¾d. c.i.f. landing weights basis 96 per cent., or about 10s. 6¾d. f.o.b. Hamburg for 88 per cent., but transactions are limited. Meltings, owing to a holiday, were reduced 48,000 tons, which, with imports of 29,000 tons, reduced stocks below last year's.

From cane-producing countries Cuba reports very satisfactory progress, and expects a record crop, limited mostly by the grinding capacity and the duration of grinding weather; Java suffered from rains again, and the crop is not quite equal to last year's.

Business in cane sugar in the United Kingdom continues slow, and prices do not show the same advance as the other descriptions. Sales include about 1,500 bags, including British West India, crystallized Trinidad, middling yellow 15s. 3d. to 15s. 9d.; 800 bags syrups, medium soft yellow St. Lucias, 11s.; 1,070 bags good yellow crystallized Surinam bold grain also sold at 15s. to 15s. 6d.; syrups, 240 bags good yellowish, 13s. 9d. to 14s. In Liverpool 3,851 bags Brazilian realized 11s. 7½d. to 11s. 9d. quay terms.

Tea.

By Messrs. Wm. Jas. and Hy. Thompson.

5s. 7½d. paid for Darjeeling Pekoe.

The feature of the past week's (ending September 10th) Sales has undoubtedly been the attention given to fine and finest teas, which just now are showing, in most cases, excellent quality, and for which there is undiminished enquiry at full rates, with frequent advances for stand-out parcels. Several really choice "hill-flavoured" invoices from Darjeeling were fully appreciated, as much as 5s. 7½d. per lb. being paid for the Broken Pekoe grade from the Jungpana Estate, this being the highest reached this season. Musters lately received from Assam, however, are showing a falling off as regards the colour of tip and are also rather lacking in point.

The rather smaller sales of Indian teas—some 10,000 packages less than last week—about served the Trade's requirements, although the idea that a large quantity would be printed for the following week was not without its effect on prices, and medium Assams were perhaps a trifle easier to buy in some instances. Tippy teas, both leaf and brokens, continue in strong request, and with a useful selection on offer some high prices were given, the Broken Orange Pekoes of Pabbojan and Dheodaam realizing 2s. 11½d. and 2s. 7½d. per lb. respectively. Some very flavoury invoices were also offered from Darjeeling, and these were picked out and appreciated by the Trade, who gave long prices for choice quality, Jungpana Broken Pekoe selling at 5s. 7½d. per lb., and Phuguri Broken Orange Pekoe at 4s. 3d. per lb.; leaf grades from this district were not in quite so much demand and here and there showed a little easiness. Low medium and common descriptions are quite firm at last week's rates and have maintained their value throughout the Sales. The quotation for fair common Pekoe Souchong remains at 6⅝d. per lb. Two small invoices from Nyasaland and Straits Settlements respectively sold at an average of 6d. per lb.

The following gardens realized the highest averages :—Darjeeling—Jungpana, 3s. 1½d.; Phuguri, 2s. 3¼d.; Tukvar Company, 1s. 11d.; Thurbo, 1s. 5d.; Darjeeling Company, Phoobsering 1s. 4½d.; Chong Tong, 1s. 3¼d. Assam :—Powai, 1s. 4¼d.; Tara 1s. 3¼d.; Pabbojan and Digultarung, 1s. 3d.: Lengri, 1s. 2¾d.; Dheodaam, 1s. 2¼d.; Behora, 1s. 1¼d.; Deopani, 1s. 1d.; Doomur Dullong 1s. 0¾d.

For the whole Sale the average price was 9⅝d. per lb., against 8⅝d. per lb. last year.

Telegrams show that at the Calcutta Auctions held

Friday, September 3rd, 28,000 packages were sold at an average price of 6 a. 11 p.; last year 5 a. 8 p. was realized. There was a brisk demand generally, medium to good qualities were strong and common kinds irregular and occasionally lower.

The considerably smaller amount of Ceylon shown on offer, viz. 22,605 packages, caused a strong market to be anticipated, and prices paid have fully come up to expectations. Clean black leaf Pekoe Souchong was again firmer, little being obtainable at 6½d. Pekoes, that have recently been selling at 6¼d. to 6¾d. showed a good farthing advance, and leaf teas of rather better quality in a good many cases were ¼d. to ½d. dearer. Low brokens, though a steady market, were no dearer on the whole. Medium to good teas, both leaf and broken, were in good demand, and sold at ¼d. to ½d. above previous prices. Dusts were wanted at low rates, and fannings were dearer. The following are the highest averages:—Goatfell and Mount Vernon, 11¾d.; Kenmare and Ragalla, 11½d.; Sutton, 11d.; Glen Alpin, Tillicoultry, Troup, St. Leonard's and Ledgerwatte, 10¾d.

The result for the whole Sale was 8½d. per lb., against 7⅞d. per lb. a year ago.

A considerable business has been done in China privately, lower grades of Moning selling from 4½d. to 5d. per lb., and to some extent up to 6½d. per lb., these showing firm rates in sympathy with the strong tone among low priced Indians and Ceylons; while there is a steady trade in the better grades up to 1s. per lb. Somewhat large shipments of Monings are due this week, a considerable portion of which, however, may not be placed on the market. Panyongs have changed hands from 5½d. to 8d. per lb., about previous rates.

The demand for all grades of Java was well maintained, better class brokens showing frequent advances. The highest averages obtained were:—Tanawattee 10d.; Merang, 9¼d.; Haluwatte and Tjibogel, 8d. and 7¾d. per lb. as recorded against 7d. per lb. in 1908.

The India-rubber Market.

By Messrs. S. Figgis and Co.

Fine Hard at 8s. 7d. *per lb.*

Alterations in the day of Rubber Auctions.

At a meeting of rubber brokers and buyers on September 1st, it was agreed that the auctions will in the future take place on Tuesdays at 11 o'clock, instead of Fridays at 12 noon as heretofore, and that catalogues are to be out and samples on show on the Monday previous by 10.30 a.m. Any rubber not shown by sample then is not to be offered in the auction on the Tuesday.

That brokers will bracket small lots together as much as possible, and suggest that not less than 2½ cwt. of each quality be shipped at a time, now that the trade is so increasing, as small lots can be held back by planters without deterioration until they can make a larger shipment. All lots under 2 cwt. to be lotted in the catalogue as "Star Lots," and when not bracketed with other lots at the auction to be offered at the conclusion of the other portion of the catalogues, or sold privately, whichever the selling broker decides.

By August 23rd there had been a more active demand for Para rubber, and a good business had been done at nearly 2d. above previous quotations for fine hard, forward and distant deliveries. The catalogues of Plantation offered this morning[1] met a very brisk competition at higher prices, especially clean brown and dark crêpes. Prices included Malay Plantation up to 8s. 1¼d.

The market during the week ending September 3rd was more excited, with large sales at advancing prices, especially for deliveries, of which sellers are "short" and fine, for "forward" delivery. Castilloa showed an advance of 3d. per lb., prices realized including—

Hard Fine September, about 8s.

Caucho Ball.—Spot, 4s. 5d. up to 4s. 6½d.; forward, 4s. 6½d. to 4s. 7½d.

In auction, on September 3rd, Plantation was in very animated demand at a considerable advance in price, as detailed below:—

Malay.—100 tons catalogued. Sheet, fair to fine, 8s. 0½d. to 8s. 3d.; fine smoked, 8s. 5d. to 8s. 5¼d.; mixed inferior, 7s. 9d. to 7s. 11¼d. Crêpe, good to fine pale, 8s. 1½d. to 8s. 3d.; fair to good palish, 7s. 7¾d to 7s. 11¾d.; light brown and grey, 7s. 1¼d. to 7s. 7d.; clean brown, part dark, 6s. 6¾d. to 6s. 11¼d.; dark brown, part specky, 5s. 6d. to 6s. 3d.; black and soft, 4s. 4d. Scrap and virgin pieces, fair to fine, 5s. 2½d to 5s. 6d.; mixed inferior, 4s. 10d.

Ceylon.—17 tons catalogued. Biscuit and sheet, fair to fine, 8s. 0¼d. to 8s. 3¼d.; crêpe, good to very fine pale, 8s. 0½d. to 8s. 4d.; clean brown, 7s. 3½d. to 7s. 6¼d.; dark brown, 6s. 6¼d. to 6s. 10¾d. Scrap, fair to fine, 5s. 2d. to 5s. 8d.; mixed inferior, 4s. 9d.

The market during the week ending September 11th was again active at advancing prices for fine Para, and large sales were made at 2d. advance. Transactions included—

Hard Fine.—September delivery up to 8s. 2d.; September—October, 8s. 1d.; October—November, 7s. 5½d.; November—December, 7s. 2d.; January—February, 6s. 10d.; February—March, 6s. 8½d.

Soft Fine.—September—October, 7s. 5d.; October at 7s. 4d., and September, 7s. 5d.

Negrohead.—Scrappy scarce and higher, about 4s. 10d.; Cameta, sales at 3s. 6d.; Island, lower, 2s. 11d.

Castilloa or Caucho Ball.—1d. to 1½d. higher, after large sales. Spot up to 4s. 7d. October—November up to 4s. 7¾d.

Plantation is selling at very high prices. Good sheet, 8s. 3d.; crêpe, palish, 8s. 3½d.

The public sales on September 3rd included:—

Malay.—101 tons sold. Sheet, fine smoked, 8s. 5d. to 8s. 6d.; fair to fine, 8s. 0½d. to 8s. 3d.; mixed and inferior, 7s. 9d. to 7s. 11¼d. Crêpe, good to fine pale, 8s. 1½d. to 8s. 3½d.; fair to good palish, 7s. 7¾d. to 8s. 1d.; light brown and grey, 7s. 1¼d. to 7s. 9d.; clean brown, part dark, 6s. 6¾d. to 6s. 11½d.; dark brown, part specky, 5s. 6d. to 6s. 3¾d.; black and soft, 4s. 4d. to 4s. 9d. Scrap and virgin pieces, fair to fine, 5s. 2½d. to 5s. 7½d.; mixed and inferior, 4s. 2d. to 4s. 10d. Rambong, fine clean red crêpe, 5s. 9¾d. to 6s.; scrap, 4s. 10½d. to 5s. 5¼d.

Ceylon.—17 tons sold. Biscuit and sheet, fair to fine, 8s. 0¼d. to 8s. 3¼d. Worms, good pale, 7s. 11¼d. to 8s. Crêpe, fair to very fine pale, 8s. 0½d. to 8s. 4d.; clean brown, 7s. 3½d. to 7s. 6¼d.; dark brown, 6s. 6¼d. to 7s.; dark softish, 5s. 6d. to 5s. 11¾d. Scrap, fair to fine, 5s. 2d. to 5s. 9d.; mixed inferior, 4s. 3d. to 4s. 9d.

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[1] Owing to heavy offerings on Friday, August 20th, the sales had to be postponed until the 23rd.

Uganda Plantation.—42 cases sold. Fine smoked clean hard sheet, 8s. 2¼d.; pears, 4s. 2d.

Mollendo.—Fine, 7s. 1d. to 7s. 1¼d.; E'fine, 6s. 9d. to 6s. 10d.; virgin, 5s. 9d. to 6s.; scrappy, mixed, 2s. 10½d. to 3s. 8d.; coarse E'fine, 6s. 6d. to 6s. 8d.

Mangabeira.—Mattogrosso sheet, 3s. 6¾d. to 3s. 7¾d.; part dirty, 2s. 8d. to 3s. 3d.; Rio sheet, 3s. 3d.; part dirty, 3s.

Orinoco.—Fine, 7s. 10d.; virgin and dead, 6s.

Colombian and Central American.—Mexican Plantation pressed clean hard sheet, 5s. 11½d.; fair brown scrap, 4s. 2½d.

Madagascar.—Gummy ball, 2s. 6d.; sandy niggers, 1s. 9d.; washed nigger ball, 3s. 1d. to 3s. 2½d; dark slab, 2s. 8d.

Mozambique.—Fine clean large red ball, 5s. 1¼d; red and white ball, 4s. 3½d. to 4s. 10¼d.; Lamu ball, fair, 4s. 0¾d.; part mixed, 3s. 9d. to 3s. 10d.

Pará Rubber statistics for the month of August (tons):—

	Pará.	Caucho.	1909.		1908.	1907.	1906.
Receipts at Pará ..	1,610	260	= 1,870	agst	1,900	1,500	1,690
Shipments to Europe	940	170	= 1,110	,,	1,010	1,000	880
,, America	160	60	= 220	,,	800	490	770

Crop statistics, June 30th to August 31st, 1909:—

		Pará.	Caucho.	1909.	1908.	1907.	1906.
Pará Receipts	1909	2,670	600	3,270	3,210	2,870	3,530
	1908	2,600	610				
,, Shipts.,	Europe	1,350	460	1,810	1,670	1,850	1,570
,, ,,	America	870	70	940	1,640	940	1,730

At the time of going to press, a large business had been done in fine hard Parà at 8s. 7d. for spot, and 8s. 6d. for September—October delivery.

The London Cocoa Market.

By The Editor.

The general state of the market is very similar to this time last month. When I come to fill in the latest prices realized it will probably be seen that, whilst prices on the whole still tend downwards, Grenadas have maintained their position the best, and that where prices tend to give way, this growth, as well as others, show the greatest weakness in the best qualities, the prices of which have tended in buyers' favour, whilst the inferior cures have remained fairly steady. The Government being buyers of Trinidads and Grenadas certainly strengthened the market, which otherwise might have gone rather limp, and these orders having apparently been executed, sellers can hardly expect prices to remain quite so steady, especially for the better qualities. To what extent the stand made by our three leading manufacturers against buying San Thomé cocoa has helped to maintain the price of Grenadas and "Other W.I.," is hard to gauge correctly, but their buying steadily throughout this year of the bumper crop that Grenada is turning out, has, undoubtedly, been the main cause of this growth having done so well, for the planters in that island have been shipping their cocoa to this side in preference to America, where, up to now, no steps have been taken to boycott San Thomé cocoa. This shows that Grenada, at least, has benefited by the boycott. What will be the outcome of Mr. and Mrs. Burtt's campaign in America to try and induce the makers there to take up the boycott as well remains to be seen. Meanwhile, it is noticeable that the German Cameroons cocoa is being more freely offered here, causing one to wonder whether this is on account of our makers being able to buy this cocoa without prejudice, and so leave others, who formerly used it, to take San Thomé in its place. The other day 10,000 bags of Cameroons cocoa, which must practically be the whole of the Cameroons crop, were offered for sale, but though the quality was very good, and the beans, I believe, were guaranteed to be free from "haminess," the price set on them (54s., London landed terms) was out of proportion to the Grenadas and St. Lucias, and also Jamaicas that are obtainable at 52s. to 54s., with a tendency, be it remembered, for lower prices, which anyone taking on the whole of this offer, which is naturally deliverable throughout the coming year, could not enjoy. All of these changes are worth noting, as it shows that the San Thomé labour question has come to stay, at least, for a time. Whether the planters there will ever, in practice, as well as in theory, make any change, depends entirely on how America receives Mr. and Mrs. Burtt.

Meanwhile, I notice that Trinidads have done rather better, at least in the quantity sold, especially for good middling to good red marks. The finer marks are still difficult to move, the bulk of the business done being at 55s. 6d. to 56s. There have been some transactions in the better qualities, but details, so far, have been withheld.

Ceylons have been arriving freely, and after some preliminary "spars" between sellers and buyers as to price, the former gave way, with the result that substantial sales have taken place. Stocks of this growth are still heavy—say one-fifth of the whole—but that, of course, does not say that the cocoa is still unsold. Of the "African" on hand, just upon 11,000 bags are San Thomé, which are also supposed to be difficult to move. Whilst rather more has been doing with Guayaquils, which are decidedly cheap at present values, this growth cannot be described as moving off freely, and the finer summer Arriba, the same as fine Trinidads, are the hardest to move. The bulk of the sales have been for Caraquez at 59s. to 61s. 6d. Nearly all growths "to arrive" are above London valuations. The cause of this is considered to be partly due to American orders, and partly to "bears" having to cover sales. Owing to the latter, superior Bahias on the spot have been valued above the c.i.f. parity, and this should encourage planters to ship here and not sell locally.

According to the latest sales reported, prices on September 18th ran as follows:—

Trinidads.—Fine marks, 57s. to 58s. 6d.; middling red, 54s. 6d. to 55s.; good middling to good red, 55s. 6d. to 56s. 6d.

Grenadas.—Fine marks up to 54s. 6d., but mostly up to 54s.; good red, 52s. to 53s. 6d.; ordinary unfermented to fair fermented, 50s. to 51s. 6d. or 52s.

Jamaicas, though offering good value at the price, still hang on hand. Fair to good dull sells at 50s. to 51s.; good red, 51s. 6d. to 52s. 6d.; low unfermented to fair ordinary, 47s. 6d. to 49s.

St. Lucia.—Fine, up to 54s. 6d.; low unfermented to fair fermented, 48s. 6d. to 52s.

Dominica.—Very little sold; a few ordinary unfermented realized 49s. to 49s. 6d.

Honduras.—A nice parcel of some 240 bags sold from 50s. 6d. for fair reddish, up to 52s. 6d. for good boldish.

Brazil (Pernambuco) realized 50s.

Surinam.—A few bags good red sold at 59s.

Demerara.—Fair reddish sold at 54s.

West Coast African sold at 45s. 6d. to 46s. for fair reddish.

San Thomé is nominally worth 53s. for fine.

Bahia.—Superior is valued at 54s.

Guayaquils.—Summer Arriba has been selling at 64s. to 66s.; Caraquez at 58s. to 61s. 6d.; some Manta realized the same price (58s. to 61s. 6d.), and 54s. was paid for Tumaco.

Ceylons.—Most of the sales of late have been confined to fair to good medium and bold at 53s. to 58s., and good bold up to 62s. Since the beginning of September over 3,000 bags have changed hands on this basis.

The Board of Trade figures for August showed a slight increase in our deliveries for home consumption during last month (1,760 tons, against 1,641 in 1908), but the exports were rather less (729 tons against 775). The figures for the eight months January-August work out as under:—

Raw Cocoa only—	Landed.	Del'd. H.C.	Exported.	Stock, Aug. 31st.
Jan.-Aug., 1909—	24,912	15,694	4,240	10,168 tons
,, ,, 1908—	22,440	14,330	3,971	6,794 ,,
Increases	2,472	1,364	269	3,374 ,,

According to the latest returns, the deliveries (less re-exports) at the six chief centres work out thus:—

		1909.	1908.	1907.	
Germany	.. 7 months	24,218	19,030	22,743	Tons (Engl.).
France ..	.. 7 ,,	13,045	10,837	13,229	,,
Holland ..	.. 7 ,,	16,944	13,645	11,524	,,
Belgium ..	.. 7 ,,	4,098	3,385	2,990	,,
Total ..	..	58,305	46,897	50,486	,,
Add U.S.A. (Impts.)	6 months	34,146	19,416	21,152	,,
U.K. (Del'd. H.C.)	8 ,,	15,694	14,330	13,137	,,
Comparative totals		108,145	80,643	84,775	,,

Stocks, according to the latest returns, were:—

Havre. Aug 31st.	Stock. 1909.	Value. Fcs.	Stock. 1908.	Value. Fcs.
Pará	28,540 ..	66 to 70 ..	7,339 ..	76 to 80
Bahia	12,338 ..	62 ,, 67 ..	15,634 ..	70 ,, 75
Venezuela ..	44,920 ..	65 ,, 150 ..	34,984 ..	74 ,, 160
Trinidad ..	38,930 ..	67 ,, 70 ..	31,059 ..	78 ,, 85
Other W.I. ..	5,973 ..	60 ,, 69 ..	9,545 ..	69 ,, 78
San Thomé ..	8,180 ..	65 ,, 67 ..	1,012 ..	70 ,, 76
San Domingo	24,578 ..	58 ,, 61 ..	21,831 ..	63 ,, 68
Hayti	12,145 ..	50 ,, 63 ..	13,121 ..	54 ,, 74
Accra	12,779 ..	58 ,, 60 ..	8,116 ..	62 ,, 65
Guayaquil, &c.	30,567 G'l	66 ,, 80 ..	21,325 G'l	82 ,, 95
Total ..	218,950 bags.		163,966 bags.	
			In 1907 83,416 ,,	

London, September 11th.	1909. Bags.	1908. Bags.
Trinidads ..	17,171 ..	18,863
Grenadas ..	17,143 ..	9,411
Other W.I. ..	6,865 ..	5,336
Ceylons & Javas	21,867 ..	13,389
Guayaquils ..	17,746 ..	19,534
Brazil and Bahia	1,349 ..	1,252
African ..	13,624 ..	10,682
Other foreign ..	13,423 ..	9,702
Total ..	109,188 ..	88,169

Stocks in New York on August 31st were:—

Sanchez	20,805 bags
Bahia	16,610 ,,
Venezuela	17,380 ,,
Arriba	10,563 ,,
Trinidad	8,817 ,,
Grenada	3,182 ,,
Others	22,457 ,,
Total	99,814 ,,
On July 27th	93,116 ,,

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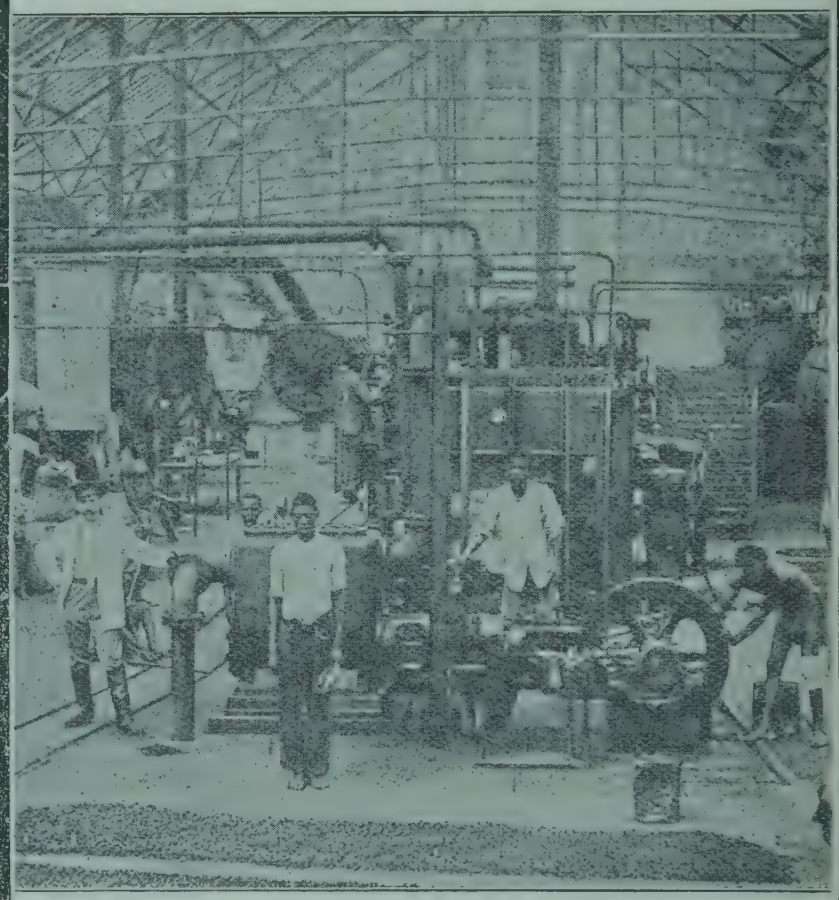

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Tropical Life:

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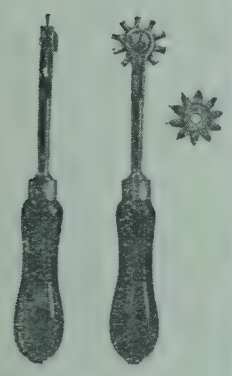

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"Tropical Life" Prize for the best Essay on The Fermentation and Drying of Cacao.

FOR those who have not seen our previous issues we would again state that we are offering a prize of £50 for the best essay on :—

The Fermentation and Drying of the Cacao or Cocoa Bean (*Theobroma cacao*).

The essay should record precisely and in full detail the changes resulting from the processes of fermentation and drying that take place in the bean from maturity in the pod to the time of putting the cured beans into bags for market. Biological as well as chemical changes should be noted. The action of maximum, minimum and optimum temperatures, and of checks producing differences of times in the fermentation and drying processes should be noted for every stage. The differences due to such variations on the resultant cured bean should be clearly traced. The possibility should be discussed of producing at will by such variations, and independently of the natural character of the bean, varieties of taste and of colour, both internal and external, so as to simulate the different kinds of cocoa known on the market. Alterations that might be made in ordinary methods so as to improve the quality of the cocoa should be explained. Waste products should be considered, and their potential value indicated.

The experiments on which results are based should deal with the beans in marketable quantities, and samples should be submitted in illustration of statements made.

The terms on which all candidates enter the competitions are as follows :—

(1) The copyright of all essays sent in becomes the property of the publishers of TROPICAL LIFE absolutely, whether successful in winning the prize or not.

(2) The publishers of TROPICAL LIFE have the sole right of publishing the essays, and the copyright of such publication to be vested in them. Permission to publish in any language must be obtained from the publishers of TROPICAL LIFE.

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(4) An English translation must accompany all essays not written in that language, so that the onus and risk as to correct translation will rest with the competitor.

(5) Essays must be written on one side of the paper only; when possible the essay should be typewritten. In any case the writing must be clear and distinct. Corrections causing doubt or difficulty to decipher must be avoided.

(6) All essays must be sent to the Editor of TROPICAL LIFE, at his City Office, 112, Fenchurch Street, London, E.C., to reach him on or before January 31st, 1911.

No essay arriving after that date will be eligible for competition. Every essay will be acknowledged on receipt.

(7) Every essay sent in must have attached to the head of the first page the competitor's full name and postal address. In submitting the essays to the Judges, the name, however, will not be made known until after the prize is awarded.

(8) After the prize has been awarded any balance left over will be devoted to publishing those essays which, in the opinion of the publishers, are considered of sufficient merit.

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Sisal Cultivation—Part IX.

SUCKERS appear certainly within the second year after planting, and often within the first twelve months, and later on they must be removed for two reasons :[1] One is that they deprive the mother-plant of the nutriment it requires to produce large leaves and plentiful fibre; the other is that the suckers are valuable either for extending the area under sisal, or for sale to other planters. To plant up 100 acres, from 60,000 to 90,000 suckers are needed, for, as Conter tells you, the minimumn umber of plants to the acre should not be less than 600 for the best soil, and the maximum not over 900 for poor soil.[2] Once a field is planted, Boyd tells you, it may be practically left to itself, as there is probably no crop, except perhaps the castor-oil plant, which requires less care to bring it to perfection, or which grows under more apparently adverse circumstances than sisal. At the same time, a little care at the outset will always be responded to by the plant. Grass should not be allowed to make headway on a young plantation, especially a kind like couch grass, that twines round the young plant, attaches itself firmly to the sisal roots, and seriously retards the growth of the plant. Conter also warns his readers against weeds and brush, which must be kept down, great care being taken whilst doing so not to injure the leaves, as a bruise or injury to them stains the fibre and lowers its quality. Of the two, especially as with care the leaves need not be damaged, the grass is worse than the risk of damaging the leaves. Even when the plants grow older and the leaves cover the ground the grass still needs attention, but the cultivation then becomes difficult. Two or three times a year, however, the fields should be cleaned. Of course in the most even of soil[3] some plants will grow faster than others. The jungle must be kept down carefully. If weeds, Dr. Mann adds, are allowed to grow up round the plants and then suddenly hoed out, it is probable, and has happened in our own experience, that the shock of sudden exposure will be too much for the plant, the then existing leaves will die, and a check be given to its growth. With young sisal, cattle, if allowed to wander among the plants, are inclined to put their feet on to, and break the centre out of a number of plants, and may even pull out the hearts of the young plants with their teeth, if there is nothing more appetizing near at hand. Deer will also eat the leaves. When the leaves are more mature, however, these troubles are overcome. Cows will not, however, touch Mauritius hemp (Furcræa). All fibre plants in India, however, are said to be extremely sensitive to fire. In India, three hoeings or weedings per annum seem to be ample to keep down the jungle; creepers, however, if present must be removed more frequently.

Before tackling the question of cropping and the preparation of the fibre, &c., we will attack the matter of "poling" and renewals. Quoting Dr. Mann again, sisal plants, after reaching maturity, "poles," and sends up from the centre a high flower stalk, which flowers, and then the plant dies. A humid climate and a moist soil tend to bring on early poling, careless cutting of the leaves and non-removal of the suckers also tends to encourage poling, as we have already pointed out. The effect of environment seems to be greater than that of individuality on the time of poling. Indiscreet use of manure brought it on in four years in India, whilst in Yusalan the plants go for fifteen and even twenty years without poling. Other centres cannot as a rule expect to go as long, twelve and even ten years will be the most that can be looked for. Forcing the plants certainly seems likely to tend to shorten their life, and the modern hustling methods of the new world, in marked contrast to those in vogue in Mexico, are not likely to obtain such prolonged yields from the plants. European and American financed concerns therefore must specialize in renewing their fields, for the plants must be renewed if the garden is to continue to yield regularly. Of course on any estate newly formed or of old standing, there will be a large number of suckers available before the parent-plants have reached the poling stage, as most of the suckers are produced during the second, third, and fourth year of the sisal plant's life. At the first signs, therefore, of any plant poling, younger ones, say about two years old and 18 in. to 2 ft. high, should be planted as close to the old one as possible, to take the place of the plant about to die, and to yield a crop in its turn with as little interruption as possible.

OFFICIAL returns show a marked tendency for Brazil to import more farming and industrial machinery. The trade in electrical light and power machinery is also increasing. Sugar engineers also are on the look-out for orders, as there are reports of the estates renewing or increasing their machinery. Rosario is importing galvanized sheeting in large quantities.

[1] Major Boyd.

[2] We show in our issue of July, 1908, that over 2,000 are planted to the acre in East Caicos, off Jamaica, W.I.

[3] "Sisal Hemp Culture," by Dr. Mann and James Hunter.

The Economic Value of a School of Tropical Medicine.

This is the third of what we hope will be a long series of articles on the excellent work that the London School of Tropical Medicine is carrying on in the Tropics, in order to make life possible where it was impossible before, and to make it more certain where hitherto it has not been safe for Europeans to remain. No one can deny that such work is of the utmost importance if valuable colonial centres are to be developed, and useful lives saved. The trade of this country needs extending; we are told that we are already the heaviest taxed nation on earth, whilst it seems doubtful if we are the wealthiest.[1] *We hear a great deal about the necessity of "broadening the basis of taxation," but far too little about broadening the basis for earning the money out of which the taxation is to be obtained. This, however, is what* Tropical Life *and the London School of Tropical Medicine mean to do. "Lest we forget," therefore, who it is that is working so strenuously, so pluckily, but also so unobtrusively to enable the enterprising trader to fill his pockets, and the Government their coffers, this notice will appear so long as the articles are published.*

"Subscriptions are badly needed to enable those connected with the London School of Tropical Medicine to push on with their work. Every resident and visitor in the tropical zone benefits through this most necessary institution, we therefore hope that every reader of Tropical Life *will send a subscription or donation to enable the work to be further extended. Cheques or money orders can be sent to P. Michelli, Esq., C.M.G., Secretary, London School of Tropical Medicine, 'Dreadnought' Hospital, Greenwich, London, S.E., or, if preferred, to the Editor of* Tropical Life. *Acknowledgment will be made in this column for all amounts sent, no matter how small, if the sender will mention the name of this paper in his letter covering the remittance."*

Malaria is the most important of the tropical diseases, both directly, as it causes serious loss of labour, and indirectly it predisposes to many other diseases, especially some of those carried by water.

Water-borne diseases occur all over the world, and those so carried in temperate climates, such as typhoid fever, are also spread in the same way in the Tropics, and, in addition, there are dysentery and, in some parts, cholera.

In all these cases the germs causing the disease are passed by the patients with their motions on to soil. In a damp soil some of them will multiply, others will remain quiescent. On a dry soil they may live for some time, and even be carried with dust by the wind. Sooner or later they may be carried to water, and when swallowed by susceptible individuals, particularly those with impaired digestion as so often occurs after malaria, the germs will rapidly multiply and give rise to an attack of the disease. Water-borne diseases such as cholera, typhoid and dysentery, are therefore carried from man to man in drinking water.

This is not all, if it were, in order to prevent the spread of these diseases, it would be sufficient to destroy or disinfect the motions of all people suffering from these diseases. Unfortunately many persons will continue for weeks, months, or even years, to pass the germs in their motions, though they have completely recovered and show no symptoms at all. These persons have acquired immunity, and the parasites which they harbour are harmless to them, but wherever they go they deposit the germs, and if these germs get into water they will set up the disease in persons who drink that water. Such persons are known as typhoid, cholera, or dysentery "carriers," and in many cases have been shown to be the active agents in the transmission of these diseases.

Where possible the destruction of all motions is to be recommended, and burning in incinerators is the best method. Burial at a depth of some 18 in. is also satisfactory, but then there is the possibility of the drainage from the burial place entering the water supply.

The water supplies in general use on estates are large open ponds or tanks or superficial wells, in either of these cases the ground around such tanks or wells must be kept clear, and no buildings, native lines or latrines should be allowed within an area of 80 times the depth of the well from it. It must not be in a hollow, and no stream, drain, or other channel likely to be fouled with refuse from houses or any public place of resort should be allowed to run near it, as urine as well as the motions may contain the germs.

Deep wells, those which pass right through at least one impervious stratum of the soil, are much safer.

All wells should have a raised parapet round them, and the ground should be cemented round so as to form a platform sloping from the well to a circular channel which collects water which is spilled or used in ablutions. If these precautions are not taken such water will run back into the well or tank, and contaminate it.

This is a special danger in places where the guinea-worm occurs. This worm when mature discharges its embryos if water is poured over the skin where the guinea-worm has protruded. These embryos, therefore, are found in the ablution water. It had been known for many years that these embryos only lived for a few days in water, but that if they entered a minute fresh-water crustacean—the cyclops—they lived for a long time and developed, but it was doubtful how they again entered man. Whether it was by bathing in water containing these infected cyclops or by drinking it; whether, in fact, the worm entered by the skin or by the mouth was the point in dispute. In West Africa, where at certain times of the year a large proportion of the labour is disabled from this cause, the matter was so serious that the London School of Tropical Medicine decided to send their helminthologist, Dr. R. T. Leiper, at a cost to them of several hundred pounds, to investigate. Dr. Leiper conclusively proved by experiments on monkeys that the guinea-worm entered their warm blooded host through the drinking water.

The correct form of prevention, therefore, is now quite clear, and the knowledge thus acquired was worth in saving of labour far more than the cost. If we succeed in preventing water used for ablution from being mixed with the drinking water, then infection with the guinea-worm is an impossibility. Separate bathing places are much to be desired, but even then a few people will drink the water, but those only will be infected.

If, on the other hand, the wells are properly protected and water used for ablution is not allowed to flow back into the wells, then the cyclops in the water will not be infected, and the people using these wells will be safe.

Boiling of the water before use will prevent most dangers, but from the economic point of view it is the health of the labour force that has to be considered, and to boil all the water for their use is impracticable.

For Europeans it is different. They can ensure that water is first filtered and then boiled, but they must not rely on the filter, and must boil the water *after* not before filtration.

[1] According to Mr. Barker, in the *Fortnightly Review*, Great Britain is taxed Mks. 95·80 per head, France, 82·70, United States of America 80·80, and Germany (if correct) only Mks. 47·17. On the other hand, we are told that, there are only £210,000,000 in the United Kingdom Savings Banks, against £800,000,000 in the German Savings Banks, and the same in the American.

Cotton News from Carriacou (Grenada).

Once upon a time, as the children say, the little islands off Trinidad (W.I.), Monos, Gasparee, Chacachacare, &c., used to produce cotton. In those days Trinidad shipped a good deal of cotton in a year. For instance, in 1865 she exported over 900 bales, but soon after that the cultivation must have fallen off, for our figures show no cotton shipments in the Customs' returns. The islet of Carriacou, off Grenada, has, however, always remained true to cotton, and especially to "Marie Galante." As this cultivation has now been continuously carried on, on the same soil, for over a hundred years, deterioration has taken place owing to the poorness of the soil. Sellers of fertilizers, therefore, would be well advised to get into touch with the Commissioner of Carriacou, Mr. Whitfield Smith, for though the island will not need many cargo lots, it certainly should need a fairly good quantity. We are glad to note that some Caravonica has recently been introduced—both the silk and wool kinds—and plots of both are growing, hardy and vigorous, at the Botanic Gardens. The Commissioner, we believe, is also very wisely trying to get the Carriacou planters to distribute their risks by planting limes, castor oil, and other products, as well as rearing poultry and raising vegetables. The latter certainly should prove remunerative, not only for Grenada's own consumption, but also for Trinidad, with its splendid shipping trade. This island on that account can always take poultry, eggs, and vegetables, especially when a fleet, or even a solitary war-vessel, is about. At such times the demand for poultry causes quite a dearth for several weeks after the fleet has departed; and at any time well-grown vegetables, poultry, eggs, &c., find a good market in Trinidad at prices that leave a fair margin of profit.

With regard to the cotton, the system of ratooning the plants for several years instead of putting in fresh plants every year, or at most every other year, is one of the great causes of the poor quality of the fibre, and the yield, which runs as low as 50 lb. of lint (200 lb. seed cotton) per acre, against perhaps 200 lb. of lint under better circumstances. With systematic manuring and better cultivation the present yields reported from Carriacou certainly should be increased. The exports of the island for 1908 amounted to £16,467, or £5,000 more than 1907. This was due chiefly to the increased output of Sea Island cotton—altogether in 1908, 2,086 cwt. of cotton valued at £11,571, and 13,000 bags of cotton seed worth £2,896; making a total of £14,467 in all, that Carriacou gets from its cotton crop. We hope in the future to hear of a further increase, and that the Caravonica cotton-planting experiments will prove a success, especially as some Caravonica is to be sent there from India, which should, coming from a tropical centre, take kindly to the West Indian climatic conditions.

Our thanks are due to the London *Times* for the very full notice, quoting Tropical Life as their authority, that they gave of the Cotton Exhibition for 1912, in which we are interested.

We still have some copies left of the bound volume of the papers read before the Conference held in connection with last year's Rubber Exhibition and shall be pleased to send same post free on receipt of 11s. 6d. As stated last month, the book is well worth securing.

The Treatment of Diseased Cacao Pods.

By Herbert J. Bult, F.C.S., and Stanley R. Bult.

The subject of fungous diseases of the cacao tree is always one of considerable interest, more especially to planters and persons actually engaged in the cultivation of cacao, since the diseases by which the tree is attacked as a rule make their appearance whilst the cacao is still on the estate, and not usually after the finished article of commerce reaches the market.

As the cacao tree always appears to be specially favourable to the growth of fungi, it is not surprising that many methods have been devised and put into practice for the extermination of these organisms. Up to the present, however, careful cutting away of diseased portions of the trees, removal of badly affected pods, and spraying of those pods and portions of the trees on which the diseases have not obtained a firm hold, have proved most efficacious, and it is the usual practice, when a pod is seen to be affected by any of the fungi which have an affinity for cacao, to apply a spraying fluid, the treatment being purely local and only upon the outside of the husk of the pod.

In the course of an examination of some diseased cacao pods which we conducted recently in our laboratory, it occurred to us that an investigation of the process of penetration of the pod by fungus might possibly enable us to ascertain whether or no the organism actually made its way through the whole of the husk of a sound, healthy pod to the seeds, as is the case with cut or wounded pods.

The husk of the cacao pod consists, of course, of a thin outer rind, a thick, pulpy pith, and a leathery layer, less thick, the two latter being separated by a hard, stony membrane, which encases the whole of the inner skin, from end to end of the pod. It is evident, therefore, that before the seeds in the cacao pod can be reached by the fungus the husk must be penetrated completely, the stony wall as well as the softer portions. This is, of course, in the case of uninjured pods; those which have by accident sustained a fracture offer a ready means of ingress to fungi if the stony membrane has been broken.

In our experiments, therefore, we selected a sound, unbroken pod, and on this a culture of the organism *Phytophthora omnivora*, commonly known as "black rot," was sown. The disease attacked the pod in several places, leaving other portions perfectly sound externally. When, however, the pod was cut open, not only was the disease apparent directly under the spots affected on the outer surface of the husk, but the growth had spread inside the pod, and, in fact, the whole of the inner surface of the leathery portion of the husk was covered with greenish-black filaments, the mycelium of the organism *P. omnivora*.

The disease had, in addition, covered the seeds and the pulpy and fibrous matter surrounding them, causing the seeds to shrink appreciably.

So great is the shrinkage due to this disease, that in an experiment recorded by J. H. Hart, in which diseased and healthy beans were fermented and cured at the same time and in a similar manner, whereas 432 beans from healthy pods weighed 1 lb., 565 beans from diseased pods were required to make the same weight, corresponding to a loss of about 25 per cent., the quality of the resulting product being, of course, greatly lowered.

The beans obtained from pods which are attacked on the outside only, and in which the disease has not pene-

trated the husk to the inside, are normal in size, plumpness, and quality.

Our investigation showed us that the rot attacked the whole of the outer pulp of the husk, eating it away to a spongy shell, and penetrated the hard, stony membrane, reaching the inner leathery skin and the seeds; but we were unable, with the aid of a powerful microscope, to detect any alteration in the appearance of the hard wall, or to observe the process of penetration. This, however, may possibly be effected in the course of a further examination.

It is evident, then, that to maintain the yield and quality of the cacao, it is necessary to combat the disease as quickly as possible, and before the organism has obtained a secure hold upon the cacao pod; for, as further experiments have proved to us, liquids cannot penetrate the husk, either of healthy or diseased pods, and therefore spraying fluids will dry upon the outer rind of the pod, or, at the most, penetrate no further than the thick, pulpy pith, and will not prevent the growth of the rot after the organism has reached the inside of the pod.

Thus it is quite plain that when once the disease has spread to the inside of the pod, no application of fungicidal liquids on the outside will produce any effect upon the disease. If the rot obtains a hold upon the contents of a pod, that pod is foredoomed to early destruction.

Naturally, the most satisfactory procedure for ensuring the suppression of fungous disease would be to treat each pod in an early stage of its growth with a fungicide, and thus prevent any possibility of attack—to "take time by the forelock," so to speak—on the assumption that prevention is better than cure. But as this procedure would be too costly for general practice, it is usually necessary to restrict the spraying operations to the pods on which fungous growths have already made their appearance, and to prevent the disease from spreading further.

In the case of pods in which black rot is suspected to have penetrated to the seeds, it may prove advantageous to pierce the husk right through with a pointed instrument, such as a piece of stout, stiff wire, pointed at one end, and inoculate the contents of the pod, by injecting through the hole thus made a non-injurious fungicide, covering the small hole made with tar. This, we believe, has hitherto not been given much attention by planters, and we therefore offer it as a suggestion. By the employment of some such method of treatment it is quite possible that many diseased pods which have been treated with spraying fluids without success could be saved, as the liquid would reach the very part which it is necessary to protect.

At the same time, the fungicide must be non-poisonous and perfectly harmless to the seeds, and must remain active when in contact with the acid substances of the pulp; but these conditions could be ascertained by comparison of the results of several experimental inoculations with different fluids whilst the pods are still on the trees.

There is one custom, extensively employed on cacao estates, which exerts a serious, although perhaps indirect, influence on the healthiness of the trees. We refer to the practice of allowing the mouldy pods and husks to lie on the ground, and to the somewhat similar custom of burying the husks with lime. The excuse put forward for these usages is frequently that the husks, when rotten, form valuable manure. But, without touching upon the question of the untidy and unsightly appearance of land strewn with mouldy, decaying vegetable matter, we consider that a far preferable and more economical way of getting rid of the refuse, and of obtaining the manurial constituents, is afforded by burning the husks.

The following table, by Professor J. B. Harrison, indicates the composition of diseased cacao-pod husk:—

Organic matter (containing 1·64 per cent. N.)	94·43 per cent.
Phosphoric anhydride	·59 ,,
Sulphuric ,, ...	·19 ,,
Sodium chloride	·11 ,,
Iron-peroxide	·04 ,,
Manganese oxide	·01 ,,
Calcium ,, ...	·27 ,,
Magnesium ,, ...	·59 ,,
Potassium ,, ...	2·85 ,,
Sodium ,, ...	·40 ,,
Silica	·50 ,,
	99·98 ,,

During the treatment of the husks with lime the organic matter is slowly destroyed, leaving the mineral constituents, to which the greater part of the manurial value of the husks is due, distributed throughout, or in other words, choked with the lime.

When, however, the refuse is burnt, the mineral matters are recovered in a concentrated state, and not distributed amongst a large amount of lime underground. The cost of the lime for treatment is not inappreciable, and this is saved, whilst the very small amount of nitrogenous matter lost through the disuse of lime can be replaced by Chilian nitrate, or, if preferable, sulphate of ammonia.

The Grafting of Cacao.

The Imperial Department of Agriculture has issued, with the above title, another of its useful fourpenny pamphlets (this time No. 61) on tropical products. This pamphlet, which contains many illustrations showing how the operations are carried out, has been prepared from notes furnished by Mr. Joseph Jones, Curator of the Dominica Botanic Station, and can be procured in London at Dulau and Co., 37, Soho Square, W., or of Bowen and Sons, Bridgetown, Barbados, for 5d., post free. Since 1891, nearly twenty years ago, we have been interested in this question of introducing grafted cacao on the estates in order to transfer from one tree to another any desirable quality that the tree yielding the scions has been noticed to possess, as by budding or grafting, as Dr. Francis Watts points out in his preface to Mr. Jones's pamphlet, one is enabled to carry forward faithfully from generation to generation many characters (as prolific bearing, resistance to disease, &c.), that cannot with certainty be reproduced by seedlings. We hope all our cacao friends will secure copies of this pamphlet, and at once take steps to carry out the suggestions that it contains. If they will let us know the results, we will publish them with pleasure.

With their September issue, our New York contemporary, the *India Rubber World*, completed their twentieth year of continuous publication without change of name or of editorial management. We congratulate our American friends on the useful work that they have done during this period, and trust to have them among us for many scores of years yet to come.

According to the *North American Review*, at least nine-tenths of the Island of Pines is now owned by citizens of the United States of America.

The Cult of the Coco-nut.

ROOT DISEASE.

IN face of the increased attention now being paid to coco-nut cultivation even by the company promoter, but still more so by the individual planter, it is a good thing that reliable authorities like Mr. F. A. Stockdale, the mycologist, attached to the Imperial Department of Agriculture, are giving the matter of coco-nut disease the close attention that they are doing. The benefits that the planters will derive from the painstaking studies of Mr. Stockdale will be substantial both in the near and distant future. If fifty years ago the fungous diseases of the cacao industry had attracted the attention and received the careful consideration that they deserved, not only thousands, but millions of pounds sterling, would have gone into the pockets of the planters, above what they actually received, and from thence benefited the trades of the manufacturing centres, owing to the increased purchasing capacity of the planting interests.

According to Mr. Stockdale, reporting on his investigations in the West Indies, three diseases, or at least the three principal diseases, that occur in the West Indies are :[1]—

(1) *Root Disease*, investigated in Trinidad, and, from specimens received from British Guiana, possibly also in Jamaica. A similar disease is described in Travancore.

(2) *Leaf Disease*, investigated in Trinidad, and apparently very similar to a disease reported from Java.

(3) *Bud Rot*, found in Trinidad, and also doubtless in British Guiana, Jamaica and Cuba. At the latter centre it is being carefully investigated, as it has occasioned widespread damage.

Trees which only present external signs of disease to the casual observer show that the roots are probably the parts which first become affected. An attack of root disease is generally first shown by the leaves. They show a slightly wilted appearance, then turn yellow, first at the tips and then gradually all over the leaflets. After the yellowing of the leaves, trees bearing a good crop of nuts, as a rule, gradually shed most if not all of them, irrespectively of their size and state of maturity, and the flowers subsequently produced do not set. The local conditions of the soil, however, must be considered before a tree can definitely be declared diseased, as its appearance also suggests lack of water ; and trees struggling for an existence in drought-affected areas might be mistaken for trees suffering from root disease.

An important point that Mr. Stockdale calls attention to, is that when a coco-nut palm is affected by any disease or pest, the terminal bud in the advanced stages of the disease almost invariably becomes involved in the state of rottenness. This state, however, must not be confused with the bud rot disease, which appears to be a specific disease, leaving the roots, stem, and leaves sound, and causing the bud only to become diseased.

Root disease seems to reduce the power of the tree to absorb water, and hence its nourishment. Things seem to go fairly well with the trees until they commence to fruit, when, if diseased, the drain on its strength seems too great, and wilting and yellowing follows. It was observed that trees just coming into bearing were the most liable to succumb. In low-lying, undrained hollows the disease was found to be worst, and it is therefore necessary to keep the condition of the soil as good as possible, in order that it may be favourable to the growth and health of the plant. Investigations tend to prove that root disease may spread by means of :—

(1) Mycelium through the soil from root to root.
(2) Spores blown from tree to tree.
(3) Germinating tubes of spores from petioles.
(4) By germinating "chlamydospores" from decaying petioles.

Possible ways, on the other hand, for attacking the disease, and, let us hope for curing it, include :—

(1) Destruction of all diseased material.
(2) Isolation of diseased areas.
(3) Resting of infected land before planting "supplies."
(4) Spraying and application of chemicals.
(5) Improved cultivation and drainage.
(6) Searching for and propagating disease-resistant varieties.

Diseased petioles that have fallen to the ground should be destroyed by burning, as they often bear a large number of spores, which seem able to live upon dead matter.

Although the book deals with cacao, many of the above remedies, as isolation by planting in belts, spraying, better cultivation, &c., are suggested in our "Future of Cacao Planting."[2]

(To be continued.)

[1] "Fungous Diseases of Cocoa-Nuts," *West Indian Bulletin*, vol. ix., No. 4, pp. 361-381.

Spruce on Cacao Cultivation in 1849.

THE BAD EFFECTS OF TOO CLOSE PLANTING.

RICHARD SPRUCE, in his "Notes of a Botanist,"[3] thus describes the cacao estates that he visited in November, 1849, about Santarem, on the Tapajos River, where it joins the Amazon, about 500 miles from Pará. "The cultivation of the cacao was far more interesting to me than the indigenous vegetation. What seems to me a defect in their management in both localities (*i.e.*, around Santarem and in Guayaquil) is the overcrowding of the plants, which, if I may trust to my memory, is more excessive at Guayaquil than on the Amazon.

"It is notable to see solitary trees near houses, and rows of trees adjacent to streams and roads, heavily laden with corpulent fruits ; whereas in the centre of the plantations, where the trees stand so close together that their branches interlace and the broad leaves completely shut out the sun's rays, where there is no circulation in the damp, mouldy-smelling air that hangs over the ground, a large proportion of the flowers drop off without being fertilized, and the few fruits that do reach maturity are more slender and the seeds smaller and thinner than on those trees to which light and air have had free access. A well-grown cacao tree, in fact, affords of itself sufficient shade to its trunk and principal branches, whereon, as is well known, the flowers and fruit chiefly grow ; and there is no need to hem it in so with other trees as to cut off the small portion of air and light that would otherwise penetrate under its drooping branches."

DR. CUTHBERT CHRISTY, the well-known authority on tropical diseases, &c., is again "on the move," but hopes to return in the spring, when a book on African rubber from his pen may be expected.

[2] TROPICAL LIFE Publishing Department. Price 1s. 2d. post free.

[3] Edited and condensed by Alfred Russell Wallace, O.M., F.R.S. Two Vols. Macmillan and Co., Ltd., 1908.

Re Cacao Fermentation.

By Dr. Axel Pryer.

(Translated by permission of *Der Tropenflanzer*, by Mr. Victor Hamel-Smith.)

Part I.

Is it altogether necessary to ferment fresh-gathered cacao seeds or beans? This question has already been repeatedly raised and discussed. However, the answer for the planters is given in the difference in the price between fermented and unfermented cacao. With Ceylon cacao this difference is so great that, as far as I know, no European out there sends unfermented cacao to market. The unimportant quantities produced by natives are for the most part consumed at home.

The bitter substances in cacao seeds give them an unpleasant taste, and this can only be removed by fermentation. Furthermore, the fermentation influences to a large extent the aroma of the product, as well as the colour of the seed, shell and inside contents (cotyledon), which are important in determining the price.

Finally, the pulp surrounding each seed is loosened to such an extent, that in the succeeding washing it is removed; following this, the drying takes place quickly and uniformly; consequently there is no doubt that it is necessary to ferment cacao; but there still prevail wide differences of opinion as to the best methods to be employed to do so.

The excellent quality of Ceylon cacao seemed to justify an examination of the fermentation process as carried on there, and after a series of large and small practical tests I have hit upon practical results. For the detailed statements of these results I wish here to express my hearty thanks to Dr. J. C. Willis, Director of the Royal Botanic Gardens in Ceylon, for his very kind help.

For practical purposes it is customary to employ many ways to ferment cacao, these, however, are similar in several points. Some of the methods of preparation in use in the West Indies are mentioned in Hinchley Hart's "Cacao," published in 1892.

Aublet said in his work, "Plants of Guiana," 1775, concerning the fermentation of *Theobroma guianensis*: "The seeds taken from the broken fruit were put with the pulp in a vessel; this substance after about twenty-four hours' fermentation became liquid and like wine; the seeds are left in until the shell becomes brown, and one is certain that the germ is killed. The quality of the cacao depends on the degree of ripeness of the fruit and the duration of fermentation; the seeds separate themselves easily from the remaining substance and soon dry; the wine-like liquid is slightly sour and drinkable; distilled it becomes a sharp spirit, which is inflammable and of pleasant taste."

Sir William Robinson reports on a method tried in Venezuela. The Conuquero dries his beans by exposing them to the sun for some five or six hours, they are then fermented until the following day; they are again exposed for five or six hours to the sun, and so on. Another method with the small planters is to ferment the cacao seeds during the night whilst still warm from the sunning.

Mr. Strickland recommends the following process: Three stone tanks to be built and cemented, each 11 ft. (3·35 m.) long, 7 ft. (2·13 m.) broad, and 5 ft. (1·53 m.) deep; high above these a corrugated iron roof is placed, and below, a drain made for the liquid. The broken cacao remains in the first tank five days, and is only covered with banana leaves, the air is supplied through five perpendicular bamboo tubes with numerous holes in them; the latter can be closed as desired, either partly or altogether, by clay stoppers. This soon produces a pleasant vinous odour, and the fermentation takes place.

The cacao is then removed to the second tank, when an acid reaction at a lower temperature takes place; after remaining for five days the cacao is transferred to the third tank, in which it is left for the same length of time. The pleasant smell then disappears, and if attention is lacking decomposition of the beans easily sets in, with formation of injurious gases and discoloration of the seeds. After the fermentation is ended the latter are washed and dried.

In Semler's "Tropical Agriculture" the actual fermentation is shortly touched on; about the different methods the following is reported:—

"The crudest method of fermentation is this: A hole is dug in the earth, and the beans are thrown in and covered with banana leaves and a thin layer of earth. The drawbacks of this process, especially in rainy weather, are too obvious to need discussing. Compared to these earth holes, cemented pits inside the warehouses, which after filling are likewise covered with banana leaves, form a great improvement. Other planters use casks or wooden cases for fermentation, others, again, pile the beans in large heaps on the floors of the warehouses, covering the heaps first with banana leaves and outside these with bags or thick cloths. The spreading out of the beans on tables or trays, or in regular layers 10 to 20 cm. high, is a process very much to be recommended. These layers are covered with banana leaves and cloths and boards laid on them. The advantage of this method consists in a moderate and very uniform heating of the whole mass."

The preparation of cacao on the Bimbia Plantation in the Cameroons is described in an earlier issue of this Journal (*Der Tropenflanzer*, second year, 1898, p. 9).

E. Friederici says "that if the three tank method is used, the whole fermentation takes about sixty hours, and the cacao heaps are turned about at least twice a day—at noon and evening. The contents of the third tank are washed in the morning, and those of the other two tanks are each brought into the succeeding tanks. The fermenting mass can easily become over-heated during the second day, and great care must be taken to avoid this."

The fermentation of cacao in Surinam, of which the following is a short extract, is fully described by Dr Preuss in his earlier account of his journey: "Eight wooden boxes, 1·5 m. broad, 2·25 m. deep and 1·7 m. high, with inclined bottoms, are placed in the small fermentation house, close together and well closed on all sides. The fresh-gathered cacao is filled in to at least 1 m. high, and one of the boxes must always be empty. Banana leaves serve as a covering, and the wooden lid is closed. On the second day the contents of each box will be shovelled into the succeeding receptacle, one again remaining empty, and so on with daily changes for five to eight days. In damp weather the fermentation goes on better than in dry. Air coming in spoils the fermenting cacao. Only on the fourth day are the boxes opened so as to encourage the fermentation. In Surinam, after fermentation the cacao is dried directly, and is therefore not washed."

(*To be continued.*)

"Tropical Life" Friend.—No. 52.

Mr. M. T. Dawe, F.L.S.

Superintendent, Botanical, Forestry, and Scientific Department, Uganda.

We first made Mr. Dawe's acquaintance on his return from Uganda in 1906. "Our Friend" had then completed a tour of nearly nine months' duration through the forest districts of the Protectorate. An account of this journey was published as a Blue Book (Cd. 2904), which is particularly valuable for the information it contains concerning the commercial resources and possibilities of this new country.

The scientific results of the mission were published in the *Linnean Society's Journal*, vol. xxxvii., November, 1906. The discoveries of most interest commercially were several new species of timber trees, hitherto unknown, and three new species of Landolphia rubber vines. The most important of the latter was named after "Our Friend" by the Kew authorities. A full description of this new Landolphia was published in the "Bulletin de la Société Botanique de France," 1906, by the French botanist, M. A. Chevalier. Regarding this species, M. Chevalier writes as follows: "From a cultivation point of view, the *Landolphia Dawei* is the most interesting creeper at present known, and we consider it as one of the most important acquisitions that tropical agriculture could make in our African colonies."

Mr. Dawe also discovered the West African rubber tree, *Funtumia elastica*, in the Uganda forests. This important discovery attracted the attention of capitalists to Uganda, and resulted in the formation of the Mabira Forest (Uganda) Rubber Company, Limited. This rubber is now well known, being in great favour with the buyers, and fetches top prices in the market.

"Our Friend" recently visited Ceylon, before returning to England, to study the agricultural conditions prevailing in that island. Previous to his departure from Uganda, we learn from the *East African Standard*, that he was presented with an address by Mr. J. B. Struthers (National Bank of India), President of the Uganda Chamber of Commerce, on behalf of the mercantile and planting communities of the Protectorate. We reprint this valuable appreciation of "Our Friend's" services to Uganda, which reads as follows:—

"Sir,—We, the undersigned members of the commercial and planting communities of the Uganda Protectorate, take the opportunity of your leaving on a well-earned holiday to express the cordial relations that have ever existed between you and ourselves, and the deep debt we owe you for the interest you have so consistently shown in those matters pertaining to our respective pursuits.

"The commercial prosperity of Uganda to a large extent is bound up with its economic products, and your endeavour has ever been to ascertain which of such products can be commercially exploited to the best advantage, and to place all your knowledge and experience on such points at our disposal.

"The cotton industry of the country has, in our opinion, been placed on its present footing largely by the work and time you have expended upon its development, and the greatest praise is due to you for its initiation. The rapid growth of the industry is evidenced by the fact that it has been found necessary to form a separate Cotton Department, whose new head, we are sure, will carry on the good work on the lines you have so ably established.

"The planting industry, though still in its infancy, has always been the subject of your especial care and attention. You were the first to discover *Funtumia elastica* in the forests of this Protectorate, and your search has proved that it is found in payable quantities. An impetus was thereby given to the exploitation of other rubber trees, and as a result there are now several plantations in the Protectorate which promise exceedingly well. In addition to *F. elastica*, you were the first to discover the rubber vine called by your name, and many valuable timber trees.

"Through your exertions development in agriculture has made such rapid strides that the increase in work has here also necessitated the formation of a separate Agricultural Department.

"It always appears a pleasure to you to take an interest in our welfare, and to do all in your power to overcome the difficulties that present themselves from time to time in a new country like this.

"In conclusion, we would wish you *bon voyage* and a pleasant holiday, and hope that we shall shortly see you back again in our midst. We only regret that the regulations of the Service do not permit us to testify our appreciation of your services in a more tangible manner."

We found Mr. Dawe very modest in his account of the difficult journey which he undertook through the Uganda forests, but the knowledge that he showed he possesses on tropical economic plants points him out as a man who will make his mark in the tropical world.

Business Notices.

1.—The address of Tropical Life is Messrs. Bale, Sons and Danielsson, Ltd., 83-91, Great Titchfield Street, London, W.

2.—All **literary communications** should be addressed **to the Editor,** and accompanied by the necessary stamps for their return if not accepted.

3.—All **business communications and payments**, either for subscriptions or advertisements, should be sent **to the Publishers** of Tropical Life. Cheques to be crossed The Union Bank of London, Ltd.

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5.—The Advertisement Department is at 112, Fenchurch Street, E.C., where all enquiries respecting advertisements, charges, &c., should be addressed to the Manager of the Department.

6.—Changes of address should be promptly notified.

7.—Non-receipt of copies of the Journal should be notified to the Publishers.

8.—The Journal will be issued on or about the twentieth of the month.

Tropical Life.

October, 1909.

The Question of Agricultural Education.

The Report[1] issued by the Departmental Committee appointed to enquire into and report upon the subject of Agricultural Education in England and Wales has, of course, been before the public on this side for about a year or more. At the time we would have referred to it in these columns, but pressure on our space, first owing to the Rubber Exhibition, and later, on account of the articles on manuring, caused us, very reluctantly, to pass it over.

As, however, we find that so few of our tropical readers who visited us this year seem to have seen or even heard of the Report, we think it better late than never to call attention to it.

The Committee included one of our subscribers, viz., Mr. Norman Lamont, M.P., whose sketch as "Our Friend" appeared in the issue of April, 1906. Lord Reay was Chairman, and other members included Lord Barnard, Lord Moreton, Mr. Francis Dyke Acland, M.P., and Professor Middleton.

When giving his evidence on June 18th, our Editor was allowed by the Chairman, Lord Barnard (Lord Reay was engaged elsewhere at the time) to go a little outside the immediate scope of the Committee's enquiry, with the idea, no doubt, that the scientific and technical instruction received by students on this side benefits our colonies when ex-students go abroad as agricultural officials or as planters. One of the main points that we have always advanced was accepted by the Committee "strongly urging that the Board of Agriculture should provide—as is done in other countries—scholarships enabling the holder to undertake post-graduate research, and also travelling fellowships to enable teachers and other suitable persons to study agriculture abroad" (see Report, p. 29, paragraph 103). In the right-hand column against this recommendation are placed the names of the three witnesses, McCracken, Hamel Smith, and Winter, who advocated this measure. Our Editor's answers to the questions asked by the Chairman, Lord Barnard, on this matter were as follows:—

"Q. 8973. How do you think these (agricultural) experts should be trained?

"Having had a scientific education in England, they should most certainly be sent round, as Dr. Preuss was by Germany, to all the cacao-producing centres to see what is doing there, and compare their way of working with the way of working in the particular centre they are going to be located in. That is the only way, in my opinion, in which you could train them.

"Q. 8974. The scientific part of their training should be first acquired in this country, do you say?

"Yes. From all I have heard of Ceylon, you can get a very good training here.

"Q. 8975. I see from the note you sent our Secretary, that one idea you have is that the officials are insufficiently paid as instructors to enable them to continue in the service of their Government when they are becoming most useful?

"Yes, the output of cacao at the Gold Coast was 80 lb. in 1891, and 20,000,000 lb. in 1906, the increase being due a good deal, I understand, to Mr. Johnston. Having brought about that most satisfactory state of affairs, down comes some private company who takes away Mr. Johnston from us just when we most want him. It is a difficult matter to arrange the pay, but still I do think it is worth noting that you lose these men just when they have obtained valuable information and been well trained in their department, and when perhaps they are most wanted. We want such men for the good of this country. We do not want to train them for others to take advantage of their knowledge.

"Q. 8977. You think instructors should also be given opportunities of travelling?

"Yes, because it often seems to me that the student has travelled more than the instructor. I got that information from Dr. Olsson-Seffer, who is now in Mexico, but is a naturalized Englishman. He told me he would not entertain the offer of most of our posts because of the pay, and also because of the way he is shut down on the spot, and not allowed to go about as the American Government send them about. He has just been round the world to study rubber, which is his speciality."

We are pleased to note that another witness, Mr. H. S. Lawrence, Director of Agriculture, Bombay, suggested to the Committee that a readership in Tropical Agriculture be established at the Universities. The Committee heartily endorsed this proposal. They believe that if such a readership were established at one or more of the British Universities it would be of considerable advantage to India, the West Indies, and other tropical and sub-tropical colonies.

Mr. William McCracken, formerly Professor of Agriculture at the Royal Agricultural College, Cirencester, and now agent for the Earl of Crewe's estates in Cheshire, said:—

"Q. 9260. I do think if the Board of Agriculture could do something by giving to a few of the very best men some travelling scholarships, it would be a very great advantage to those who are going to teach afterwards."

Professor Winter, M.A., Professor of Agriculture at the University College of North Wales at Bangor, claimed that:—

"Q. 6663. One of the things which struck him most was the fact that wherever he went he met men sent by nearly all European Governments and those of North America, but that he never by any chance met Englishmen. If the Government were to set aside a fund, say, for travelling fellowships, which could be held both by teachers and students, they would be conferring a boon

[1] Price 6s. complete, *i.e.*, Report only 9d.; Evidence 5s. 3d.

on agricultural education, the effect of which cannot readily be estimated."

The ordinary small farmer, the Report finds, is not a student of books, and does not appreciate written instruction; if, then, he is to be influenced at all, it must be by such means as are at the command of the itinerant teachers. This is, of course, quite true of farmers and planters in all parts of the world, as those who run journals like ours soon find out. It is most important, therefore, to see that the itinerant teachers or any other instructors, especially in the Tropics, are well trained, experienced men, and this is what we believe our idea of enabling those who are to do the teaching to travel round the world will help them to be. As we stated in our evidence, the pupils (*i.e.*, in the Tropics) have at times travelled more than the instructors, and if the latter are to inspire confidence in those who come to them to learn, the Government must enable the teachers to make themselves as perfect as practicable. We believe it is within practical politics to enable them to see a little of the world and what is being done in their particular line at other centres. After the issue of the report that we are now drawing attention to, we hope and believe that the Government will think the same.

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The Home Labour Market.

In our July leader on "Labour at Home and in the Tropics" we urged the consideration of utilizing British labour from this side, where we have a surplus, to develop tropical and sub-tropical areas when their labour is in demand. If such a course is open to objection on some points, which it doubtless is, it also has many advantages if worked with care and under healthy circumstances.

Since writing this article the report of the Commissioners of Prisons and Directors of Convict Prisons proves that the present industrial system in vogue on this side is dead against the interests of the individual worker and his family, if not against the country at large. If, by sending our surplus labour abroad, we on this side tend to reduce that reserve of labour kept idle as an insurance against times of "trade booms," the great evils of not doing so at times like the present, when trade is slack (and these periods of slackness exceed those of "boom" when all are working), are much greater and more costly and morally harmful to the country than if we were to permanently increase trade on this side by swelling the food-producing population abroad who need our manufactured and other wares. For this reason we are pleased to see in the columns of our contemporary, the *Home and Colonial Mail*, that "in the geography section of the British Association meeting at Winnipeg the operations of the White Australia policy were discussed. Mr. Grenory, who claimed success for this policy, said that the sugar industry had prospered since the return of the Kanakas to their homes. Kanaka labour, he declared, was subject to high mortality, and was not economical. Whites could settle in Queensland with no deterioration physically or mentally. In the sugar regions the large plantations were breaking up into small individual farms, and white labour was found more efficient than that of the Kanakas, who had all now been deported."[1]

[1] This statement should interest Mr. Summerbell, M.P., on this side, and the Hon. Prudhomme David in Trinidad, who object to coolie indentured labour in the West Indies.

In face of this, it is surely better to increase the population of our Colonies, where labour is wanted, and reduce the pressure for work and elbow-room on this side, where, even if work is obtained at an adequate wage, it is at times difficult to live near to it. If, at the same time, we can prevent a report being issued in the future similar to the one now laid before us by the Prison Commissioners, any little temporary inconvenience that we may suffer (and, probably, only advantages will be forthcoming) will be more than recouped. During the prison year ending March 31st, 1909, there was a painful increase in our prison population of 9,448 (205,681 cases against 196,233 in 1907-08). "In dealing with this fact," says the report, "account must be taken of the influence of poverty and idleness caused by want of employment . . . about one-seventh of the commitments from ordinary courts are for begging and sleeping out; after that larceny shows the greatest increase." There was a substantial diminution in cases of drunkenness and assaults. If the "new problem of chronic under-employment" is, as stated, not only chronic but increasing rapidly, and if we are to have an increasing aggregation of unskilled labour at our great ports and in our populous districts, we must be prepared for an increase in those minor offences against the law which are believed to be directly or indirectly the consequence of unemployment."

In face, therefore, of this report, and both the majority and minority report issued by the Poor Law Commissioners, there is no doubt that a large number of families over here are chronically under-employed, if not unemployed. We do not propose to send abroad those whom stress of circumstances has forced into the workhouse (as described in our July issue) or into prison, as now reported, but those of the strata above these, men, women, and children whose incomes have also been reduced, but who by struggling have managed to keep free of the degradation of "His Majesty's hotels," and who can, and will, prove of the utmost use in all ways to the trade of this country if judiciously planted out abroad.

Of course, as we pointed out in July, a great deal, and perhaps everything, depends ultimately on how such emigrants behave, but we feel certain that were compulsory labour homes to be established in this country to form the necessary basis of work, steps could then be taken to compel each man to do his share in becoming a wage-earner and customer for manufactured products and provisions, without which both the home and export trade of this country is bound to decrease.

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The Royal Horticultural Society's Colonial Fruit Show in December.

The date of the Royal Horticultural Society's Colonial Show (December 1st to 4th) is close at hand, and we hope that our readers, both subscribers and advertisers, will interest themselves in it.

The schedule contains many improvements on those of previous years, as a result of the Society's continuous experience in the special requirements of Colonial fruit exhibitions. The chief classes are as follows:—

(1) Collection of fruit and vegetables, fresh and dried.
(2) Collection of fresh fruits and vegetables.
(3) Collection of dried fruits and vegetables.
(4) Collection of nuts, spices, and such-like.

The medals of the Society will be awarded at the discretion of the Council.

Another section of the schedule provides for exhibits of preserved fruits, &c.

Detailed entries must reach the Royal Horticultural Society, Vincent Square, Westminster, London, S.W., not later than November 17th on forms accompanying the schedule.

No entrance fee or charge is made for space, and tabling is provided free of expense. The Council of the Society have been asked by many exhibitors to advertise the Show more widely. This has been willingly agreed to on the promise of subscriptions to defray the extra cost it involves, and to this extent only the President and Council look to Colonial representatives for assistance. We hope, therefore, that many fresh names will be submitted for membership.

A lecture will be given at 3 p.m. on the first day (December 1st) by Mr. Robert Newstead, A.L.S., F.E.S., on "West Indian Insect Pests."

Pará and Ceará Rubber.

To the Editor of Tropical Life.

Sir,—Pará rubber appears to have been generally the favourite in Ceylon, although Ceará gives quicker returns and a more ample yield of latex. This preference is due to the fact that at the outset Ceará was planted in unsuitable positions, exposed to the south-west monsoon. Mr. Kelway Bamber, the well-known rubber expert, reports that Ceará naturally "requires a dry climate, and does well on soils of the poorest character chemically," and he has also stated that in North-west Ceylon, which is sheltered from the south-west monsoon by the mountain zone, "two Ceará trees, aged two years and five months, gave between them a little over 1 lb. of dry rubber of very fair quality, which is far better than Pará can do, even at five or six years, unless heavily tapped."

Some of the old Ceará trees in North-west Ceylon have yielded from 2 lb. to 8 lb. per tree; but this yield seems to have been exceeded in Hawaii, for "No. 16 Bulletin of the Hawaii Experimental Station" mentions a yield of Ceará from 5 lb. to 10 lb. of crude rubber in the year.

The "Administration Report of the Zanzibar Government" states that in the Experimental Station of Agriculture where "two species of rubber have been tried—Ceará and Pará; the former has been found to produce better results. It appears to possess two advantages over the other species, in that it can be tapped at three years old, as compared with seven or eight years in the case of Pará, and that it can be more easily propagated, the seed being hard and easy of transport, and the plant growing freely from cuttings."

Apparently the good qualities of Ceará are becoming more appreciated in Ceylon, for a letter published in the *Times of Ceylon*, August 9th, 1909, respecting the new rubber, *Manihot dichotoma*, runs as follows:—

"I am greatly disappointed; in growth, at the same age, it certainly does not beat our already established Ceará, and, upon examination of the leaf and branches, certainly never approaches it in free flow of latex. Your readers may rest assured that we have in our midst a rubber—the hitherto despised Ceará—good enough for our wants, a tree better than the Hevea (Pará), and with, moreover, a far freer flow of latex in quality and quantity." "An Old Resident of Ceylon."

[Ceará Biscuit, mark "North Malale," sold at 9s. 1d. per lb. on September 28th. This shows that, at least as regards quality, the rubber, if properly prepared, leaves nothing to be desired.—Ed. *T.L.*]

Manihot Rubber Trees.

Part IV.

Seeds and Planting.

We did not mean to mention these two items, as they are so fully dealt with in the excellent Bulletin No. 16, issued by the Hawaii Agricultural Experiment Station, under the care of Mr. Jared Smith. The Jamaica Bulletin (edited at that time by Mr. Fawcett) for January to March, Parts I. to III., also contains important information on the subject, as they include a translation by Mr. D. A. Wetherall, of a treatise on the Ceará tree from the *Bulletin of the Department of Agriculture*, Bahia, Brazil, for August, 1902.

As, however, several of our readers have asked us to touch on the chief points in regard to seeds and planting out, we have much pleasure in acceding to their request, before going on to the question of tapping, which is the main cause of our taking up the subject at all just now. Having given full particulars of the Hawaii and Jamaica Bulletins, their editors will excuse our not mentioning them again this month when quoting them.

Another authority—who, however, writes in Spanish—is Senor Augusto Cardoso, who is publishing a series of articles in *La Hacienda*, of Buffalo. This authority tells you that the Maniçoba tree should be planted in such a way as to be shaded as much as possible, as that encourages its growth. The wind, Cardoso tells you, is the worst enemy of the Maniçoba, as it can easily break it, or at least blow it down. Cold winds are, above all, prejudicial even when not strong, as they dry the leaves rapidly. The latex, we are told,[1] occurs in the leaves and leaf petioles, as well as in the bark of the twigs, trunk, and roots; in fact, there is a continuous network of milk tubes all through the living green portion of the bark of the trees. The wood alone contains no latex, although there are latex tubes in the pith.[2] This being so, it is easy to realize that, whatever affects the leaves of the tree would, since the network of the tubes is continuous, more or less affect the whole tree. The tubes themselves are not continuous—that is, by cutting through the tubes at the base of the tree, you cannot drain the tree of its latex, but in the living plant there is a free transfer of the latex from one tube to another. The latex-bearing tissues may rather be compared to a series of short tubes joined end to end with permeable diaphragms between.

This necessity of protecting the trees from strong winds for fear of breaking, or from drying winds on account of its adverse effect on the leaves, tends to make one plant as closely as possible, so as to enable the trees to help to protect each other from the wind. Another advantage in close planting is that it keeps down the weeds, which seems necessary. As, however, no well-conducted, cultivated estate should have young plants out in the open, but should rear them in the nursery or in bamboos like cacao, this should not be a main reason for close planting. It seems that ants are very partial to the seedlings, and cause much mischief; so do rats and mice. To avoid these and other pests, it is all the more necessary to start with a nursery, which can at least be started away from such plague, with an isolating clearance around them.

[1] *Hawaii Bulletin*, No. 16.

[2] The Commission appointed by the Bahia Government to study the Maniçoba cultivation report that the milk appears in abundance at the branches and roots. They also encountered latex in the pith. Does this refer to the pith of the roots, which, as the tree ages, becomes filled with pith saturated with water?

If they appear, steps must then be at once taken to trace them to their source in order, if possible, to exterminate them.

Cardoso, in *La Hacienda*, gives some useful hints with regard to choosing the spot for a Ceará nursery and laying it out. "The ground," he tells you, "must be sheltered from the winds, and should be near water, so as to enable you to water both the seed-beds and the nursery.[1] The seeds will be sown *à granel* (in bulk or close together), and covered with a thin coating of earth. The nurseries should be worked a month or two before the rainy season sets in, and should always be kept abundantly watered. When fifteen days old, the plants should be taken from the seed-bed and transplanted into the vivero, where they will remain for a year at least, and should still be kept well watered in case of a failure in the rainfall. Even after the rainy season has ended the watering should be continued for a month or two. This irrigation gives the plant a long period of continuous growth from its start, and thus provides for the rapid formation of trees of large dimensions in the future.[2] At the end of a year the final planting-out can be started. The trees should be placed in a perfectly upright position in holes 1 m. (39 in.) cube, more or less, and surrounded with organic refuse and earth."

The *Hawaii Bulletin* says that the holes should be at least 2 ft. across, and as deep as possible. This authority does not say at what age to undertake the final planting, but that in Hawaii it is best done in the spring (January to March), following the rule that those seedlings which receive the benefits of hot, growing weather make a better and more healthy growth than those planted at the end of the growing season. A good time to transplant, they add, is in the evening or late in afternoon, or on cloudy days, so that the plant may become accustomed to its new location without excessive welting.

According to the *Bahia Boletim*, quoting Senor Delpeche, plants a month old were 15 cm. (6 in.). Another planter (H. Lember) recommends planting the seeds in an open bed, about 3 in. apart, covering them with about ½ in. of soil, and water twice a day if no rain falls. The bed should be well exposed to the sun, as shade spoils the seed. They can be transplanted when 1 ft. high.

The question of the germination of the seed must be left over until another time, we would add here a note from the Curator of the Rhodes Matopo Park (S. Rhodesia) who writes that he has obtained very successful germination from Ceara rubber seeds soaked in water for three weeks before sowing, instead of adopting the old method of filing the seeds.

With regard to the harm that overshading can do on an estate, it is interesting to note that Spruce, the traveller and botanist, in his "Botanist on the Amazon," reports that he found in warm, moist, and shady equatorial forests, the very leaves on the trees became covered with beautiful lichens and hepaticæ. Beautiful, no doubt to Spruce in 1849, but not to the planter of to-day, and therefore air and light must be given access to the trees if their bark and leaves are to be kept clean.

[1] The Spanish word is *vivero*, as can be seen a line or two further down. Senor Cardoso recommends transplanting twice—the first time at fifteen days old into the vivero, and then about a year later into the full estate.

[2] There is a tendency for tuberous roots to become mildewy and rot in continuously sodden ground; the planter must therefore see that there is a sufficient amount of drainage to avoid this.

The India-rubber Market.

By Messrs. S. Figgis and Co.

At the beginning of October the rubber market, after touching 9s. 1½d. on October 1st for fine hard, became depressed, and prices for forward delivery were forced down 5d. to 6d. per lb. By October 5th, however, prices for fine hard Pará, October delivery, had recovered to 8s. 10d., whilst Castilloa, after touching 5s. 0½d., eased down to 4s. 11d.

At the auctions on October 5th competition was again good, and, on the average, prices were almost up to the previous sales' rates, say—

Malay Plantation.—Sheet: fine smoked, 9s. 6d. to 9s. 6¼d.; fair to fine, 9s. 0¾d. to 9s. 1d.; mixed, part pressed, 8s. 10d. to 8s. 11½d. Block: fair pale, 9s. 2d. Crêpe: good to fine pale, 8s. 11¼d. to 9s. 1½d., one lot, 9s. 3¼d.; fair to good palish, 8s. 8¼d. to 8s. 11d.; light brown and grey, 8s. 2d. to 8s. 9¾d.; clean brown, part dark, 7s. 6d. to 8s. 2d.; dark brown, part specky, 6s. 5d. to 7s. 6¼d.; black and soft, 5s. to 6s. 1d.

Ficus or Rambong.—Crêpe, fine clean red, 6s. 8¼d. Scrap, good, 4s. 10d. to 5s.

Ceylon.—Sheet and biscuit, fair to fine, 9s. 0¾d. to 9s. 1d. (one lot, very fine pale, 9s. 1¾d.). Crêpe, fair to fine pale, 9s. 1¼d. to 9s. 1¾d. (thick Rosehaugh, 9s. 3d.); fair palish, 8s. 8¼d. to 8s. 11½d.; clean brown, 7s. 10¾d. to 8s. 4½d.; dark brown, clean, 7s. 5¾d. to 7s. 8¼d.; dark, part soft, 6s. 5d. to 7s. 4½d. Scrap, fair to fine, 6s. 6d. to 6s. 9½d.

Colombian and Central American sells well. Good dark scrap, 4s. 1½d. Mexican black pressed, Crêpe, 5s. 4¼d.

Uganda at high prices. Pears, 4s. 6¼d. to 4s. 7¼d; pressed sheet, fair, 6s. 0½d. to 6s. 4¾d. Whitish Lamu ball, 3s. 10d. to 3s. 10¾d. Pressed strips and ball, 4s. 1½d. to 4s. 2½d.

Mozambique held too high. Reddish ball sold at 3s. 9d. to 4s. 1¾d.; sandy rejections, 2s. 6d. to 3s. 8d.

Benguela.—Niggers, part heated, 2s. 9¾d.

Abyssinian.—Fair thin sheets, 4s. 0¼d. to 4s. 1d. Thick sheets, 3s. 7½d. to 3s. 8½d.

On October 8th, after several fluctuations, the market closed flat at a decline, fine hard at 8s. 10d. for October delivery down to 7s. 3d. for March. April delivery Castilloa was lower at 4s. 10d. By the 13th the price for Pará had advanced, but the rise was lost, prices closing at 8s. 10d. again. Large arrivals of Plantation for the auctions on the 19th are expected, but the sales took place after we went to press.

On October 15th the market after being less active, closed firm, especially the more distant positions of fine hard cure, with Sales of October delivery at 8s. 8½d., rising to 8s. 10d. (asked). Soft fine November delivery, at 8s. 2d. to 8s. 1d.

Castilloa Ball.—Quiet, with small sales of Upriver November—December delivery at 4s. 9½d.

Pará rubber statistics for the month of Sept. (tons):—

	Pará.	Caucho.	1909.		1908.	1907.	1906.
Receipts at Pará ..	1,780	240	= 2,020	agst	2,350	2,410	2,070
Shipments to Europe	810	270	= 1,080	,,	1,130	1,260	960
,, America	1,150	50	= 1,200	,,	1,090	860	1,080

Crop statistics, June 30th to Sept. 30th, 1909:—

		Pará.	Caucho.	1909.	1908.	1907.	1906.
Pará Receipts	1909	4,450	840	5,290	5,560	5,280	5,600
	1908	4,710	850				
,, Shipts.,	Europe	2,160	730	2,890	2,800	3,110	2,530
,, ,,	America	2,020	120	2,140	2,730	1,800	2,810

Cotton.

The following were the prices for Cotton in London on October 8th, according to Messrs. Slann and Davies :—

	Good Fair.	Good.	Fine.	Superfine.	Good 1909.	Good 1908.	Compare
	d. d.	d. d.	d. d.	d.	d. d.	d. d.	
Surat kinds * ...	$5\frac{5}{16}$ to $5\frac{5}{8}$	$5\frac{5}{16}$ to $6\frac{5}{16}$	$5\frac{13}{16}$ to $6\frac{5}{8}$	—	$4\frac{3}{8}$ to $4\frac{3}{4}$	$4\frac{5}{8}$ to $5\frac{5}{8}$	per lb.
Madras	$5\frac{7}{8}$ to $6\frac{1}{16}$	$5\frac{5}{8}$ to $6\frac{5}{16}$	—	—	$3\frac{15}{16}$ to $4\frac{11}{16}$	$4\frac{9}{16}$ to $5\frac{9}{16}$	—
Bengal	—	$5\frac{1}{8}$	$5\frac{3}{8}$	$5\frac{1}{2}$	$3\frac{7}{16}$	$3\frac{5}{8}$	—
Assam	—	$5\frac{3}{8}$	7	$7\frac{3}{4}$	$4\frac{3}{8}$	$5\frac{1}{4}$	—
China	—	$5\frac{7}{8}$	$6\frac{1}{4}$	$6\frac{3}{4}$	$4\frac{1}{2}$	$4\frac{7}{8}$	—
West Indian ...	6	$6\frac{1}{2}$	$7\frac{1}{4}$	$7\frac{3}{4}$	$5\frac{5}{8}$	$7\frac{3}{4}$	—
Sea Island ...	$8\frac{1}{4}$	$10\frac{1}{2}$	15	$17\frac{1}{2}$	9	13	—
Australia	$7\frac{3}{8}$	$7\frac{3}{4}$	—	—	$5\frac{3}{4}$	$7\frac{3}{8}$	—

* Liverpool quotations.

Two important items of information have been published this week, ending October 8th, viz., the Ginners' second Report, showing 2,562,000 bales ginned to September 25th, as against 2,590,639 bales last year, and the Bureau Report, giving the average crop condition as 58·5, against 63·7 last month, and 69·7 last year. The market rather weakened upon the receipt of these figures, and after some sharp fluctuations closes about 10 points down for near, and unchanged to 4 points advance for the very distant months. Spot (middling) in Liverpool is 21 points cheaper at 7·15d. Manchester is quiet. East Indian Cotton is somewhat irregular.

The import into Liverpool this week amounts to 44,569 bales; since September 1st, 134,495, same week last year 46,185, last year's total 141,114 bales. The estimated Sales amount to 54,000 bales. Middling American is quoted at 7·15d. per lb.; last year, 4·97d.; 1907, 6·62d.

The latest quotations of Americans for delivery, basis middling, any port, G.O.C., were :—

	October 8th. d.	Last Week. d.	Last Year. d.
October	$6{\cdot}92\frac{1}{2}$	7·02	4·66
Oct.—Nov.	6·89	6·96	$4{\cdot}56\frac{1}{2}$
Nov.—Dec.	6·88	6·92	$4{\cdot}51\frac{1}{2}$

Movement of American Cotton since September 1st :—

	1909-10.	1908-9.	1907-8.
Brought into sight	1,426,000	1,318,000	932,000
Exports from United States since September 1st—			
To Great Britain	202,000	224,000	205,000
To Continent, &c.	507,000	471,000	274,000
Total crop	—	13,825,000	11,572,000

Coffee.

By Messrs. C. M. and C. Woodhouse.

There was a good demand for the moderate supplies offered at public sale during the week ending October 8th, especially for coloury descriptions, which realized full rates. A small quantity of East India (Neilgherry) sold readily at steady prices, and Nyasaland also was in good request. Central American kinds were fully steady, and Colombian was firm particularly for fine qualities. The stocks in the principal ports of Europe on October 1st, according to Messrs. Düüring and Zoon, were 7,987,000 bags against 8,466,000 bags in 1908, and 8,970,000 bags in 1907, an increase for the month of 355,000 bags against a decrease of 46,000 bags at the same date last year. The visible supplies show an increase for the month of 1,287,000 bags against an increase of 196,000 bags in 1908, the total on October 1st being 16,480,000 bags as compared with 15,137,000 bags, and 16,757,000 bags in 1908 and 1907 respectively. The market for futures, in sympathy with New York and Continental advices, has been firm and advancing, and the closing price of December Santos, though a little below the best, shows an advance of 1s. per cwt. for the week. We quote :—

		1909. To-day.	Sept. 30th.
London ..	Santos, Dec. delivery.	32s. 0d.	31s. 0d.
New York ..	No. 7 Rio ,,	5·60 cents	5·35 cents.
Hamburg ..	Santos ,,	33 pf.	$31\frac{3}{4}$ pf.
Havre ..	Santos ,,	$41\frac{3}{4}$ francs	$39\frac{3}{4}$ francs.

The receipts at Rio and Santos from July 1st to October 6th, 1909, were 7,715,000 bags, against 4,735,000 bags and 4,011,000 bags in the two previous seasons respectively.

Sales include the following, viz. :—

East India.—105 bags Neilgherry, at 52s. for smalls, 54s. 6d. to 58s. for second size, 62s. 6d. to 67s. for bold.

Nyasaland.—425 bags, at 40s. to 44s. for smalls, 47s. to 53s. 6d. for low middling to good middling, 54s. to 61s. 6d. for middling to good middling bold.

Costa Rica.—425 bags, at 45s. to 54s. for good ordinary to low middling, 60s. to 62s. for middling bold.

Guatemala.—85 bags, at 48s. 6d, for smalls, 51s. to 54s. for middling to good middling, 64s. 6d. for bold.

Vera Paz.—180 bags, at 47s. 6d. to 49s. 6d. for smalls, 49s. 6d. to 57s. for fine ordinary to middling, 58s. to 70s. for middling to good middling bold.

Peruvian.—23 bags, at 36s. 6d. for mixed brownish smalls.

Colombian, &c.—1,250 bags, at 35s. 6d. to 46s. 6d. for smalls, 43s. 6d. to 49s. for fine ordinary to low middling, 52s. 6d. to 58s. for middling to good middling, 48s. 6d. to 55s. 6d. for fine ordinary to middling bold, 57s. 6d. to 72s. for good middling to fine bold.

Dumont Santos.—2,700 bags, washed at 36s. 6d. to 41s. 6d. for smalls, 43s. 6d. to 45s. 6d. for medium, 50s. to 52s. for bold; unwashed at 34s. for smalls, 35s. 6d. for medium, 37s. to 38s. 6d. for bold foxy.

Rubber Shares.

Rather lower values have ruled this week (ending October 15th), but the tone on the whole is firm, and a good business continues in most descriptions of shares. There has been a fair amount of speculators' profit taking and something of a "shake-out" generally, and the position is consequently much healthier.

Comparative prices with last month rule as follows:—

	October 14th		September 9th
Bukit Rajah	$8\frac{3}{8}$ to $8\frac{5}{8}$	..	$8\frac{1}{8}$ to $8\frac{3}{8}$
Cicely Estates Co. (Ord.) ..	$11\frac{1}{4}$ to $11\frac{1}{2}$	..	$9\frac{3}{4}$ to 10
Highlands and Lowlands ..	2 to $2\frac{1}{4}$	..	$2\frac{1}{4}$ to $2\frac{3}{8}$
Klanang Produce Co. ..	$5\frac{7}{8}$ to $6\frac{1}{8}$	..	$5\frac{1}{4}$ to $5\frac{3}{8}$
Lanadron Estates	4 to $4\frac{1}{2}$	..	$4\frac{7}{8}$ to $5\frac{1}{8}$
Linggi Plantations (2/- paid)	24/- to 24/6	..	22/9 to 23/3
Perak Rubber Co.	$3\frac{3}{8}$ to $3\frac{1}{2}$	..	$2\frac{7}{8}$ to 3
Selangor Rubber Co. (2/- paid)	34/3 to 35/3	..	33/- to 34/-
Shelford Rubber Co. ..	32/6 to 35/-	..	28/9 to 30/-
United Serdang Rubber Co.	$3\frac{7}{16}$ to $3\frac{9}{16}$	..	$3\frac{3}{16}$ to $3\frac{5}{16}$
Vallambrosa Rubber Co. ..	22/9 to 23/9	..	21/6 to 22/-

Prices quoted in previous issues should be compared with above.

We hear that Mr. W. H. Johnson, F.L.S., ex-Director of Agriculture at the Gold Coast, and now occupying a similar position with the Mozambique Company, is proceeding to San Thomé and elsewhere to study their methods of cacao cultivation. Later on the results of his investigations may appear in book form. Such a book would be gladly received, for since Hart's and Olivieri's books we have had no book on cacao based mainly on the author's own experience, and the present-day planter sadly needs a practical book on these lines. Rumour says that Mr. Johnson was offered the important post of Director of Agriculture in Southern Nigeria, but did not see his way clear to accept the offer.

Sugar.

Mr. C. Czarnikow, writing on October 7th, reported that the United Kingdom Board of Trade Returns bear out our anticipations of deliveries from invisible stores, because the official deliveries show a falling off of over 30,000 tons. We believe that now only have we arrived at fair comparisons, the invisibles in both years having probably been reduced to the same low level. There are less than 5,000 tons foreign refined in the total bonded United Kingdom stores; even if we had not had the finishing operations last week, we should be reminded that the season does not end on August 31st, but that September is often the most interesting part of it, as maintained by us for years. The old Hamburg stock is not offering, not even the refined tendered against raw sugar contracts, and supplies are therefore more limited than ever before. New sugars have not come to market yet, and Lyle had to raise his prices twice during the week. Dealers seeing September at 13s. 9d. and October at 12s. 9d., probably thought that on October 1st the cheaper article would be at their disposal, in which they find themselves disappointed, and prices of new crop are improving on deficient quality of roots. Of course, every day brings us nearer to the new supplies, but in the meantime ready white sugars are only quoted from Belgium and Holland at previous high prices, and, of course, from France. This scarcity cannot last long now, and finally crop results will be the determining factor, unless America enters our market for supplies of beet. That is a point not cleared up yet.

The United States meltings are still maintained at 47,000 tons, and they would have to drop suddenly to 30,000 tons to avoid beet imports. Brazil has to supply some Argentine demand, and whether more Louisiana sugars would be brought round we cannot say. It seems but reasonable to suppose that efforts would be made to consume as much Louisiana and home-grown beet as possible before the arrival of the new Cuban crop, and the latter may be brought on a little earlier; but last year it was found that canes before Christmas yielded only 6 to 8 per cent., which does not pay to work. At present the weather is rather wet, and on heavy soils this does more harm than good. Louisiana cables raise the estimate to 340,000 against 350,000 tons last year.

As regards beet crop, the weather in Western Europe has again been warm and wet, the roots showing good increase in weight, whilst the polarization remains very backward. This is not surprising when compared with last year's exceptional quality, and hopes are set on fine autumn weather to improve the quality, whilst increasing the weight. Whether we shall get it we are not competent to judge. Of course, the bulk of the crop will have to wait for better weights and quality, otherwise the deficiency would be very serious; nor can these results be taken as representing a fair average.

The Magdeburg weights are catching up last year's, but the polarization remains much behind, though the weather in Germany was not too wet, and with warm days the nights were cool. The soil is not so hard as last year, when much loss by breakage occurred, and if the quality improves, it is hoped that with larger sowings Germany may make nearly as much as last year, whilst Austria is rather disappointed. With only 10,000 hectares less sown, it seems that 100,000 tons less sugar is expected.

In the United States buyers have shown some interest in near-at-hand sugars, but not much business has resulted. The quotation for spot centrifugals, after a slight relapse has recovered to last week's figure of $4.23\frac{1}{2}$ cents = 11s. 9d. c.i.f. landing weight for 96 per cent. polarization non-preferential centrifugals = 10s. 9d. f.o.b. Hamburg for 88 per cent. net beet.

In the United Kingdom also little interest has been manifested in anything except arrived and near sugars, transactions in which show fully steady prices; but the quantities available are far from plentiful. Grocery crystallized sells slowly at unchanged values.

From cane-growing countries the advices are on the whole satisfactory. Cables from Cuba report rainy weather, which is favourable mostly for crops growing in light soils, whilst the West Indian mail states that the atmospheric conditions in Barbados are excellent, and the growing crop is making good progress. From Trinidad, too, favourable weather is reported. In Porto Rico heavy rains have been experienced in the southern part of the island.

The total transactions of British West India for the week amount to only about 4,000 bags. Crystallized Demerara, very fine palish yellow 17s. 6d. to 17s. $7\frac{1}{2}$d. duty paid. Crystallized Trinidad, low middling yellow 14s. 9d., middling ditto 14s. $10\frac{1}{2}$d. to 15s., good middling yellow 15s. 3d., fine yellow 16s. to 16s. 3d. Crystallized Jamaica, low brown 14s. 3d. to 14s. 6d.

Fifty tons native Penang sold to arrive at 10s. $4\frac{1}{2}$d. landed terms, in bond.

In Liverpool 910 bags grainy Mexican sold at 11s. $10\frac{1}{2}$d. quay; 487 bags Peruvian syrups at 9s. $4\frac{1}{2}$d. quay; 2,300 tons Java at 12s. 3d. to 12s. $3\frac{3}{4}$d. basis 96 per cent., part ex quay, part ex store.

Tea.

By Messrs. Wm. Jas. and Hy. Thompson.

Ceylon Golden Tips at 9s.

At the auctions this week (October 7th) values have been well maintained, the principal attention being paid to fine grades, both Indian and Ceylon sales including several choice parcels which were fully appreciated.

From the Indian Tea Association's telegram relative to crop prospects we gather that the out-turn last month was good in Upper and Central Assam and Eastern Dooars, normal in North Cachar and Western Dooars, and poor in all other districts. Prospects, however, are mostly favourable, except for Terai, where a large portion of the district is practically closed with blight.

The quantity of Indian catalogued was about average for the time of year. Good liquoring teas were wanted, the best being picked out and competed for. The only weak spot in the market was, perhaps, among plain ordinary teas round about 7d. to 7½d. per lb. These were rather easier to buy, and on Wednesday occasionally showed a fractional decline in value. Common descriptions show on the whole no change, fair Pekoe Souchong being obtainable at 6½d. to 6¾d. per lb. Fine and finest grades of bright tippy tea were in strong request, and, aided by country orders, all desirable parcels sold well. Some very useful invoices from Darjeeling included in the catalogues evoked spirited competition, and long prices were paid for fine flavour. Southern Indian teas are a steady market, with, however, a quotation here and there in buyers' favour. The result of the whole sale was 9¼d. per lb., compared with 8⅝d. per lb. a year ago. For next sales 48,472 packages are advertised.

Importers of Ceylon brought forward 20,450 packages, against 22,600 packages a year ago. Quality, in a good many cases, chiefly in medium-class tea, is showing a slight falling off, though a high standard is still maintained in the finest grades. The latter, in consequence, have been the strongest market, while 9½d. to 10d. kinds have only sold at about late rates. Leaf tea, with flavour, generally did well, and medium leaf found fairly strong support. Medium brokens compared with last sale are slightly easier, teas from 8d. to 9d. frequently falling short of last prices by ¼d. to ½d. per lb., part of the decline being due to difference in quality. Low-priced leaf is about steady. Two or three lots in an invoice shipped from New York made low quotations, but there was little else to be bought under 6¾d. Dusts and fannings are steady.

The following averages are of interest: Henfold, 8 boxes Golden Tips averaged 9s.; Goatfell, 1s.; Demodera, Sutton, Cranley, and Brookside, 11½d.; Tillicoultry, 11¼d.; Mahadowa and West Fassifern, 11d.; Battalgalla, Silverkandy, Talawakelle, and Waltrim, 10¾d.; and 8⅝d. per lb. was realized for the entire sale against 7¾d. per lb. last year.

There is a steady business doing privately in low China Monings, at previous quotations, and some shipping trade has taken place in the higher grades of Kintucks. Panyongs from about 5½d. per lb. to 7d. per lb. have continued in demand, and Souchong Siftings have changed hands from 3¼d. to 4d. per lb.

At the Java sale on October 7th a firm tone characterized the auctions, and prices all round showed no change. The best averages were: Tanawattee, 9¾d.; Goalpara, 9½d., and 7¾d. per lb. was realized for the whole sale, against 6⅞d. per lb. last year.

The London Cocoa Market.

By The Editor.

Our Board of Trade figures for September tend, if anything, rather to strengthen the market from a seller's point of view, for, as the following figures show, the stock has been reduced 850 tons since the end of August, and if the exports for the month show a falling-away of 100 tons, so do the landings, whilst our deliveries for home consumption show a further increase of 260 tons, say—

Raw Cocoa only—	Landed.	Del'd. H.C.	Exported.	Stock, Sept. 30th.
Jan.-Sept., 1909—	26,725	17,816	4,743	9,310 tons
,, ,, 1908—	24,333	16,183	4,576	6,159 ,,
Increases	2,392	1,633	167	3,151 ,,

During September only 1,869 tons were landed against 1,966 tons last year, and 2,122 tons delivered for home consumption against 1,862 tons last year.

The three undermentioned countries compare as follows for the first seven months:—

	1909.	1908.	1907.
United Kingdom	15,694	14,330	13,137 tons
Germany	27,389	21,507	25,093 ,,
France	14,766	12,560	15,021 ,,
Total	57,849	48,397	53,251 ,,

The feature of the month has been the steady buying of Trinidads, between 3,000 and 4,000 bags having changed hands, a large proportion at 56s. to 57s. for fine good red marks, and 58s. for La Compensacion San Juan F.A. The effect of this is already shown to a slight extent by the smaller stock on hand (15,107 bags on October 9th, against 17,292 bags on September 18th), but will probably be more noticeable by the end of October, when further deliveries will have been taken, for proportionately only a small quantity will be received. On the other hand, a larger share than usual of the purchases are for the home manufacturers, and may not be taken up so quickly as those bought for export. From the other side the news all points to the possibility of as good a crop coming forward in 1909-10 as has been obtained during the crop year now closing, which, as most of our readers are aware, will exceed last year's record crop by some 40,000 bags. Meanwhile, whatever is going to be received during the next twelve months, supplies during the month of November show no signs of being heavy, and the crop will, from all accounts, be four to six weeks later than at first anticipated, and no substantial supplies can be looked for at consuming centres until after Christmas. When they do come along at first, orders on hand, now hung up for want of supplies, are likely to keep prices fairly steady, and owing to this I do not anticipate any noticeable falling-away in values for Trinidad until the New Year. Of other growths, one or two transactions in Guayaquil took place during the latter half of September, including good Arriba Guayaquil 64s., fine 66s. The receipts during last month were, for a wonder, much behind last year's (30,000 qtls. for September, 1909, against 52,500 qtls. in 1908), though the total receipts are far beyond those of any previous year. With San Thomés the effect of the boycott is plainly shown in the falling-away in the deliveries for home consumption. Up at Liverpool, though, be it noted, the exports are very much larger.

Stocks, according to the latest returns, are:—

Havre. Sept. 30th.	Stock. 1909.	Value. Fcs.	Stock. 1908.	Value. Fcs.
Pará	31,278 ..	66 to 72 ..	7,564 ..	78 to 81
Bahia	12,123 ..	62 ,, 67 ..	14,406 ..	62 ,, 68
Venezuela ..	48,854 ..	67 ,, 140 ..	37,228 ..	72 ,, 150
Trinidad ..	36,417 ..	67 ,, 70 ..	29,274 ..	77 ,, 82
Other W.I. ..	5,060 ..	61 ,, 69 ..	8,790 ..	67 ,, 74
San Thomé ..	7,530 ..	65 ,, 67 ..	1,994 ..	64 ,, 68
San Domingo	29,429 ..	58 ,, 63 ..	30,770 ..	59 ,, 64
Hayti	10,618 ..	53 ,, 62 ..	11,398 ..	50 ,, 67
Accra	9,170 ..	58 ,, 60 ..	7,822 ..	59 ,, 62
Guayaquil, &c.	30,722 G'l	65 ,, 77 ..	21,055 G'l	70 ,, 87
Total ..	221,201 bags.		170,301 bags.	

London, October 9th.	1909. Bags.	1908. Bags.
Trinidads ..	15,107 ..	16,644
Grenadas ..	15,082 ..	7,994
Other W.I. ..	5,897 ..	4,756
Ceylons & Javas	21,990 ..	11,415
Guayaquils ..	20,710 ..	21,200
Brazil and Bahia	1,718 ..	859
African ..	10,830 ..	9,385
Other foreign ..	13,006 ..	9,230
Total ..	103,340 ..	81,483
	In 1907	38,257

By October 16th the stock had been reduced to 99,396 bags.

Prices, according to the latest business done, run as follows. This includes the sales on October 12th, when 470 Grenadas and 234 Bahias were offered. The Grenadas sold at times quite 6d. above previous rates, and Dominicas (only 57 bags offered and sold) 6d. to 1s. up.

Trinidads.—Good middling to good red marks, 55s. to 56s. 6d.; good to fine marks, 57s. to 58s.

Grenadas.—Good to fine marks, 53s. to 55s.; common unfermented to fair fermented, 50s. to 52s. 6d.

Dominicas.—Good reddish, 50s. to 51s.; fair, 49s.

Jamaicas.—Good reddish, 52s.; fair, 50s.; common unfermented, 46s. to 48s.

St. Lucia.—Good to fine, 52s. to 54s.; ordinary to fair, 48s. to 51s.

St. Vincent.—Good reddish, 51s.

Demerara.—Good reddish, 54s. 6d.

Seychelles.—Fair boldish, 53s. to 54s.

Samana.—Fair reddish, 48s.

Bahia.—Superior, 54s.; fair, 51s. to 52s.

San Thomé.—Fine is valued nominally at 51s. 6d. In face, however, of the price asked for Cameroons, San Thomé should be worth more. Since the end of May the stock in London of this growth has fallen from 18,000 to 9,000 bags.

Cameroons.—Good fermented, 53s. to 54s.

West Coast Africa.—Good reddish, 50s.; common to fair, 45s. to 48s.

Java.—Fine bold, 68s.

Guayaquils.—Arriba, 63s. to 66s.; fair Caraquez, 58s.; Manta (Caraquez quality), 58s.

Ceylons.—Fine bold, 67s. to 70s.; fair to good medium and bold, 55s. 6d. to 66s. 6d.

Stocks in New York on October 5th were :—

Sanchez	19,998 bags
Bahia	15,306 ,,
Venezuela	16,204 ,,
Arriba	11,618 ,,
Trinidad	6,281 ,,
Grenada	2,564 ,,
Others	19,835 ,,
Total	91,806 ,,

For the crop year ending September 30th, 1909, the total output from Trinidad was 267,214 bags (148,260 to Europe, and 118,954 to America), against 230,785 bags during 1907-8, the previous record.

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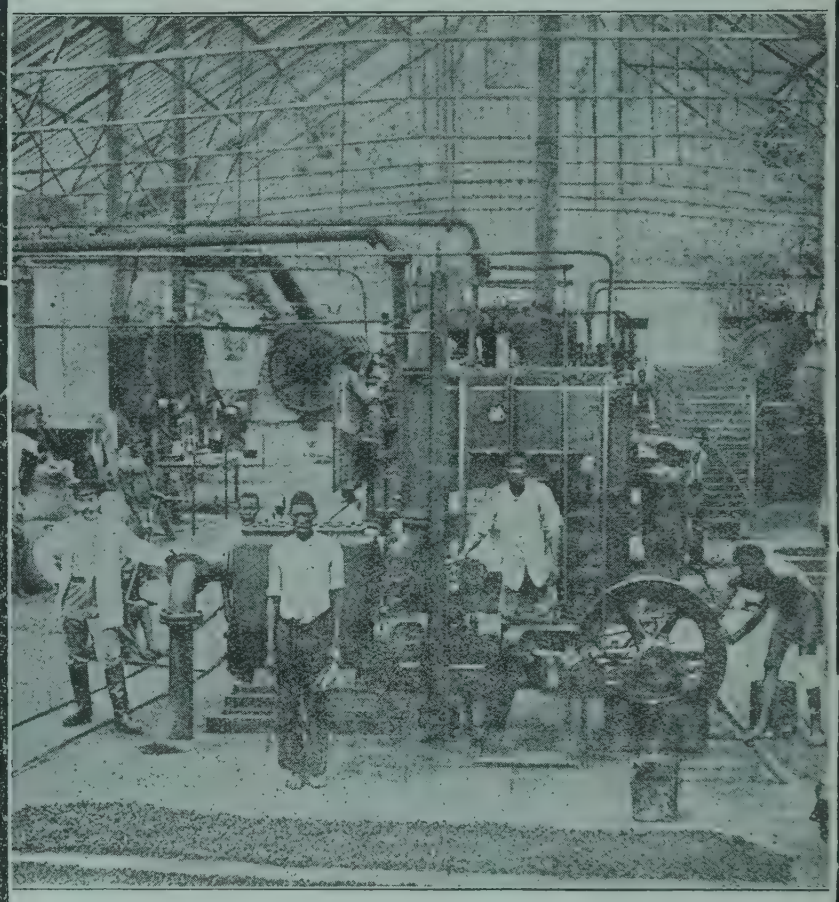

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Tropical Life:

A Monthly Journal devoted to the Interests of those living, trading, holding property, or otherwise interested in Tropical and Sub-Tropical Countries.

VOL. V.—No. 11.] NOVEMBER, 1909. [ANNUAL SUBS., 10/- / SINGLE COPIES, 1/- } POST FREE.

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"Tropical Life" Prize for the best Essay on The Fermentation and Drying of Cacao.

THE CUBAN GOVERNMENT SUBSCRIBES £5.

We have received the following letter from the Secretary of the Agricultural Department, Cuba:

"The writer realizing the great importance to the industries of this Island of the competition started by you in order to encourage closer study on the "Fermentation and Drying of Cacao," has heard with pleasure of the idea, and in consequence of this has had the article translated (into Spanish) and published in the *Boletin del Departamento*, in order to bring the matter before the planters, &c, on this side, so that they can join in this idea of TROPICAL LIFE, either by subscribing to the prize fund, or by sending in essays to compete for the prize.

"This department (Secretaria de Agricultura Commercio y Trabajo de la Rep. de Cuba) has heard of the project with much interest, and has the pleasure of subscribing £5 to the fund, and encloses cheque for that amount. At the same time it sends two copies of the *Boletin*, with the terms of the competition, &c., translated into Spanish.

"ORTELIO FOYO,
"Secretary of Agriculture, &c."

The copy of the Government bulletin sent, reproduces in Spanish full particulars of the competition, as published in the May issue of TROPICAL LIFE, including a list of the subscribers to date, and a reprint of our coupon.

This support from so influential a quarter is most welcome, and will further stimulate our friends to take part in the competitions, either as subscribers to the prize fund, or as competitors for the prize. Two or three friends wrote at the start to say that they were considering the matter of subscribing to the funds. If they are able to bring these considerations to a conclusion and arrive at a favourable decision, we shall be able to offer a second prize of £25, *which we are most anxious to do.*

Meanwhile, for those who have not seen our previous issues, we would again state that we are offering a prize of £50 for the best essay on :—

The Fermentation and Drying of the Cacao or Cocoa Bean (*Theobroma cacao*).

The essay should record precisely and in full detail the changes resulting from the processes of fermentation and drying that take place in the bean from maturity in the pod to the time of putting the cured beans into bags for market. Biological as well as chemical changes should be noted. The action of maximum, minimum and optimum temperatures, and of checks producing differences of times in the fermentation and drying processes should be noted for every stage. The differences due to such variations on the resultant cured bean should

be clearly traced. The possibility should be discussed of producing at will by such variations, and independently of the natural character of the bean, varieties of taste and of colour, both internal and external, so as to simulate the different kinds of cocoa known on the market. Alterations that might be made in ordinary methods so as to improve the quality of the cocoa should be explained. Waste products should be considered, and their potential value indicated.

The experiments on which results are based should deal with the beans in marketable quantities, and samples should be submitted in illustration of statements made.

"TROPICAL LIFE" PRIZE FOR THE BEST ESSAY ON THE FERMENTATION AND DRYING OF COCOA.

COUPON to be filled in and returned, with the essay, to the Editor of TROPICAL LIFE, 112, Fenchurch Street, London, E.C.

I hereby agree to be bound in all respects by the decision of the Editor of TROPICAL LIFE and the conditions printed below. In case of dispute the Editor's decision to be final and binding.

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The Publishers reserve to themselves the sole right to publish any or all of the essays submitted.

The terms on which all candidates enter the competitions are as follows:—

(1) The copyright of all essays sent in becomes the property of the publishers of TROPICAL LIFE absolutely, whether successful in winning the prize or not.

(2) The publishers of TROPICAL LIFE have the sole right of publishing the essays, and the copyright of such publication to be vested in them. Permission to publish in any language must be obtained from the publishers of TROPICAL LIFE.

(3) Every candidate or competitor agrees to accept as final and to abide by the award of the Editor of TROPICAL LIFE, whose decision in the matter must be taken as binding. No correspondence can be entered into respecting the awards.

(4) An English translation must accompany all essays not written in that language, so that the onus and risk as to correct translation will rest with the competitor.

(5) Essays must be written on one side of the paper only; when possible the essay should be typewritten. In any case the writing must be clear and distinct. Corrections causing doubt or difficulty to decipher must be avoided

(6) All essays must be sent to the Editor of TROPICAL LIFE, at his City Office, 112, Fenchurch Street, London, E.C., to reach him on or before January 31st, 1911. No essay arriving after that date will be eligible for competition. Every essay will be acknowledged on receipt.

(7) Every essay sent in must have attached to the head of the first page the competitor's full name and postal address. In submitting the essays to the Judges, the name, however, will not be made known until after the prize is awarded.

(8) After the prize has been awarded any balance left over will be devoted to publishing those essays which, in the opinion of the publishers, are considered of sufficient merit.

(9) Competitors must fill in and attach the above coupon to their essay.

The Economic Value of a School of Tropical Medicine.

This is the fourth of what we hope will be a long series of articles on the excellent work that the London School of Tropical Medicine is carrying on in the Tropics, in order to make life possible where it was impossible before, and to make it more certain where hitherto it has not been safe for Europeans to remain. No one can deny that such work is of the utmost importance if valuable colonial centres are to be developed, and useful lives saved. The trade of this country needs extending; we are told that we are already the heaviest taxed nation on earth, whilst it seems doubtful if we are the wealthiest.[1] *We hear a great deal about the necessity of "broadening the basis of taxation," but far too little about broadening the basis for earning the money out of which the taxation is to be obtained. This, however, is what* TROPICAL LIFE *and the London School of Tropical Medicine mean to do. "Lest we forget," therefore, who it is that is working so strenuously, so pluckily, but also so unobtrusively to enable the enterprising trader to fill his pockets, and the Government their coffers, this notice will appear so long as the articles are published.*

"Subscriptions are badly needed to enable those connected with the London School of Tropical Medicine to push on with their work. Every resident and visitor in the tropical zone benefits through this most necessary institution, we therefore hope that every reader of TROPICAL LIFE *will send a subscription or donation to enable the work to be further extended. Cheques or money orders can be sent to P. Michelli, Esq., C.M.G., Secretary, London School of Tropical Medicine, 'Dreadnought' Hospital, Greenwich, London, S.E., or, if preferred, to the Editor of* TROPICAL LIFE. *Acknowledgment will be made in this column for all amounts sent, no matter how small, if the sender will mention the name of this paper in his letter covering the remittance."*

We are pleased to be able to report that the following contributions have been received by the School of Medicine:—

J. Anderson	**£20 0s.**
G. Mansfield	**£3 3s.**
F. Warrack	**£2 2s.**

We trust that this may stimulate others to send in their subscriptions and donations so as to enable us to bring the amount up to £50 by Christmas. Will you help us to do so?

The economic value of the London School of Tropical Medicine lies mainly in the fact that it is the training ground and supply depôt of an army of medical men whose duty in the Tropics is to render possible the development of these regions without undue loss of health and wastage of life. The greatest enemy to merchants, missionaries, contractors, planters, Government officials, and others who have to live in the Tropics is disease. It saps their energy, reduces their usefulness, and very often succeeds in destroying them. That is one aspect of the question when the ordinary diseases of the Tropics affect the individual. The monetary losses under these circumstances, though patent enough to the person who suffers, and enormous when the amount for each individual is added together into one sum, and viewed as a whole, may not be so obvious as they are when an epidemic prevails, but they are there all the same. They are represented in the loss of working days, in the frequent

[1] According to Mr. Barker, in the *Fortnightly Review*, Great Britain is taxed Mks. 95·80 per head, France, 82·70, United States of America 80·80, and Germany (if correct) only Mks. 47·17. On the other hand, we are told that, there are only £210,000,000 in the United Kingdom Savings Banks, against £800,000,000 in the German Savings Banks, and the same in the American.

invaliding with its expenses, in the cost of substitutes, and in the impossibility of continuity of work which is essential for the success of profitable enterprises, whether large or small.

In the case of an epidemic, especially if it be of cholera, plague, or yellow fever, everyone recognizes the effect it has on the financial position. As the epidemic gains ground and the fatality mounts up panic occurs among the inhabitants. There is a general cessation of work, accompanied by flight. Trade is immediately affected, and everyone suffers. The monetary loss has become a general one, more general even than the epidemic, for the loss is not confined to the locality, but affects those who are its near neighbours, or have trade connections with it. Even here few have any conception of the enormous loss entailed. Glasgow congratulated itself a few years ago, when it escaped with a loss of a million pounds sterling, caused by a few cases of plague. The Cape Government spent in less than six months nearly half a million to stamp out plague from Cape Town, and lost much more by the hampering and restrictions put on trade. The half million was, however, well spent, for it saved South Africa from an epidemic. The losses in Bombay by the outbreaks of plague there has been estimated at many million pounds sterling. An epidemic of cholera or other rapidly spreading and fatal disease soon runs into hundreds of thousands of pounds, and in a short time into millions. But apart from wide-spreading epidemics, great losses have been sustained by planters and contractors of labour, owing to their coolies being attached by cholera or other disease on their transit to the gardens or works, or on the gardens or works. It has been no uncommon thing after having expended large sums in securing coolies to lose many of them on the way, or at the busiest season of the year. If the work is to go on these losses have to be made good, whatever the cost. It is the same in the construction of railways or whatever large works are in progress, needing large numbers of coolies. The essential factor for success is that the workers shall be healthy when they arrive, and shall remain healthy.

By supplying medical men trained in tropical diseases the London School of Tropical Medicine is raising a powerful force to overcome the obstacles and expense in the development of tropical countries. During the ten years of its existence 1,000 medical men have completed their education at the School, the majority of whom have gone abroad in the employment of Governments, of sanitary and port health authorities, of missionary societies, of trading, planting and mining companies, as explorers, investigators, and private practitioners. The training has been by means of lectures, practical instruction in the laboratories, and clinical work in the Hospital. There are three important branches in the School. The first concerns itself with the health conditions likely to be found in the Tropics, and the measures to be taken to improve them, and lessen the prevalence of disease. The second deals with the diagnosis of disease and treatment of the sick, and the third occupies itself with the methods to be adopted in research by which obscurities in the cause, diagnosis, treatment or prevention of a disease may be dispelled, and our knowledge on the subject advanced. To efficiently carry out the work of the three branches, even on a small scale, necessitates a great expenditure. There have to be for each branch teachers and demonstrators, laboratories, and a hospital. The lecturers may do their share of the work for little or no remuneration, but laboratories and a hospital cost money to build, to equip, and to constantly maintain. Hitherto the School has been living on a hand-to-mouth policy, just able from the fees of the students, contributions from the public, and grants from Colonial Governments and India to pay its way. Handicapped in this way there are no endowments for the payment of its teachers, and it is no nearer that goal than when the School was first established. There are no funds for urgently needed extension of laboratories, and the inadequate extensions that have been effected place the School in financial difficulties.

Apart from the extension of existing laboratories, additional ones are required if the School is to carry out in full the objects for which it was founded, and if it is to retain its place in the van of those daughter schools of tropical medicine that have been formed or are about to be formed by other nations. A museum also is wanted which shall contain in one department specimens illustrative of tropical diseases; in another those of venomous snakes, poisonous fish, biting insects, and other animals connected with the causation and spread of disease, and in a third department models relating to hygiene, sanitation, and the prevention of disease in the Tropics. It is evident that such a museum would require a curator and assistants, aud cannot be established or maintained without a great deal of money for its endowment.

Professor Osler, in his address in October last, at the opening of the winter session of the Tropical School estimated that to put tropical medicine on a proper basis in London as the centre of an Imperial Tropical Institute some two million pounds sterling were needed. We would be content with half a million, which could be employed in the following manner:—

(1) Endowment of special departments and the School generally, including practical training in public health for the Tropics.

(2) Capital sum for expeditions and research.

(3) Enlargement of laboratories and additional laboratories.

(4) Assistants to each of the following departments: Anthropology, helminthology, protozoology, and tropical preventive medicine.

(5) Capital sum for farm and animal houses, including director and assistants.

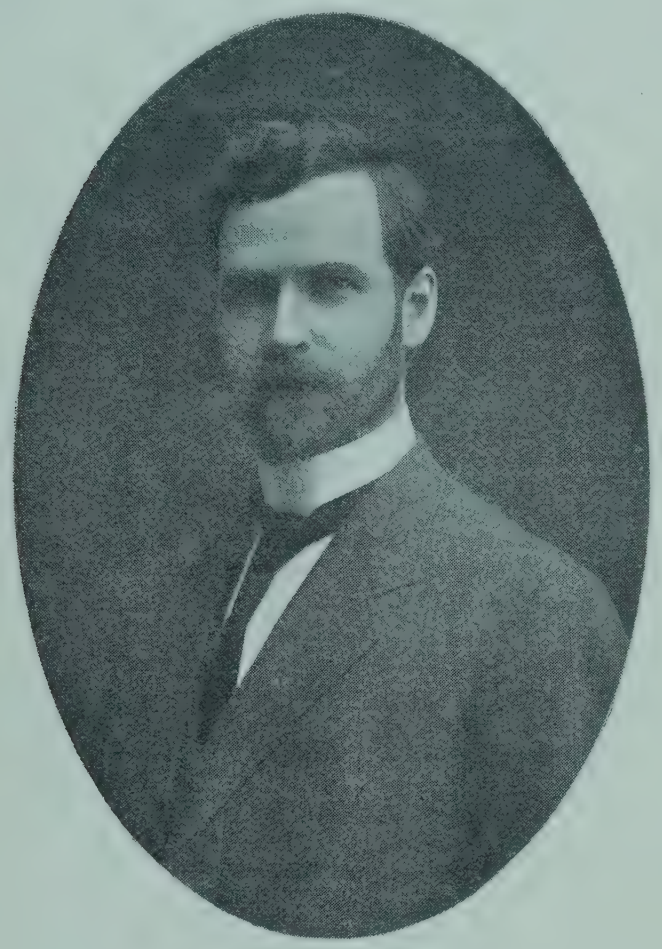
(6) Capital sum for library and museum and maintenance thereof.

———

Under Señor Molina, as Director of Agriculture, Mexico is making great progress in matters agricultural. It has been decided that one experimental station at least shall be established in each State; when this is done, therefore, there will be some thirty stations in all. Of these, four have already been established and are at work. Their influence on matters agricultural is certain to be of great benefit, and will give a great impetus to improved methods of cultivation, and a more general use of machinery of the latest type. The recommendations contained in Dr. Olsson-Seffer's report have been adopted to a considerable degree, and further investigations are being carried out to further develop the cultivation and exploitation of the numerous economic products that are grown, or can be grown, in Mexico. Those having agricultural machinery, oil engines, fertilizers, and transport systems to sell will do well to watch the agricultural development of this go-ahead Republic.

Mexico as a Rubber Producer.

Since Dawe proved that the Mabira Forest was well worth exploiting as a rubber-producing centre, no one has done more useful work in bringing before the notice of rubber consumers, fresh sources of supply of this now costly raw material than Dr. Olsson-Seffer. This authority, whose articles on Castilloa rubber, published in our columns, proved of such great use to the Castilloa rubber world in 1907, and again this year, is now staying in London. Whilst here he has been showing scientists and others, photographs of the new rubber-producing trees that he has discovered since he was last on this side. Numberless accounts of these plants have recently appeared in the London press, giving more or less detailed accounts of the trees. We give the following particulars, however, of Dr. Olsson-Seffer's personal descriptions, and can therefore vouch for their correctness.



Dr. Pehr Olsson-Seffer.

Now on a visit to London to introduce the new Mexican rubber plants to English consumers.

All the plants lately discovered are not equally valuable, but it would seem as if the least important would compare favourably with Guayule (*Parthenium argentatum*), and should therefore be equally lucrative to exploit, if supplies forthcoming could compare with those of the desert shrub. The new species include several of the *Plumeria* family, the scientific names of which have still to be settled. These plants appear to be distributed over considerable areas in many parts of Central and Southern Mexico, and yield a "milk" somewhat similar to Castilloa, and is obtained by tapping the trees in the ordinary manner.[1] The flow is best from November to January, and the latex has yielded up to 24 per cent. of rubber. The average returns, however, would probably work out at 14 to 16 per cent. Nearly 1¼ lb. of rubber has been obtained from a single tree, but such a yield has so far proved exceptional. With this tree is found the much-advertised *Euphorbia fulva*, Stapf, or Palo Amarillo, also another euphorbia, which, if not *E. California* or *E. Hindsiana*, has still to be named. This yields a latex that so far has proved rather poor in rubber, both as regards quantity and quality, and so does not seem likely to prove of great commercial importance. The *E. calyculata* (H.B.K.) has also been tried, and proves capable of yielding a very good grade of rubber. The latex is very white, contains about 21 per cent. of rubber, and flows freely. Of another kind the *Jatrophaurens* or Mala Mujer, the latex does not run well, as it coagulates almost on appearance. As a gum it stands between gutta-percha and rubber. The tall shrub that yields this latex is a prolific grower, almost a weed, and on account of the facility of propagating it, it may become even a more important commercial factor than Guayule. Dr. Olsson-Seffer also found an apparently new *Jatropha* in Southern Mexico that yielded a good grade of rubber, but which has still to be fully experimented with.

Between all these different discoveries there seems some reason to believe that the Mexican output of rubber may eventually be increased by 1,000 to 2,000 tons annually, as we understand that the necessary capital has been raised over here to finance the propositions, and the supply of plants from which to extract the raw material seems plentiful and likely to last. These advantages, together with Dr. Olsson-Seffer's experience and influence in Mexico and the United States, should cause the various discoveries above described to be of considerable importance to the rubber world, now that the price of Pará is so high.

[1] Mr. William Cradwick, Agricultural Instructor, Jamaica, reports that a fourteen-year-old Castilloa tree, in Jamaica, was tapped by the Bowman-Northway method, on a modified herring-bone system, and 1 lb. of rubber was obtained; the pricker used four days after gave another 5 oz. The results Mr. Cradwick considers to be most ncouraging. The tree was 49 in. in diameter 3 ft. from the ground.

Cacao Planting of To-day in Mexico.

The Need of Botanic Stations.

(By our Special Correspondent at Pichucalco.)

I have lately returned from Pichucalco, where I saw a lot of cacao. From what I noticed on two or three of the estates that I visited I did not form a very favourable opinion of what had been accomplished. The stricture passed by Mr. Barrett upon the cacao planters of Trinidad[1] would apply with equal if not still greater force to the planters of Chiapas. Not that many of them are not intelligent and anxious enough to advance, although there are also many who are content to worry along in the old way without attempting to effect any sort of improvement, but they labour under considerable difficulties and disadvantages. For instance, there are at present no government or private experimental stations in the country devoted to the solution of problems in cultivation, &c., and no technical literature in the language of the country seems to be available.[2] I was frequently asked if I could not recommend some good work dealing with the subject of cacao planting, but while I know of several in English, I know of none in Spanish.

[1] See "Future of Cacao Planting," p. 91, price 1s. 2d. post free.

[2] This is why it was proposed to republish the "Future of Cacao Planting" in Spanish.

Judging from what I have seen elsewhere I found the following methods in Pichucalco the most open to criticism :—

(1) Trees set much too closely together, preventing proper root development and proper ventilation.

(2) The inter-planting of Castilloa for shade.

(3) No pruning done.

(4) Nurseries ill made and ill cared for, resulting in poor seedlings for transplanting.

The Departmento de Fomento is doing a great deal towards the natural resources of the country, but it has a big job on its hands, and it cannot be expected, of course, to tackle everything at once. No doubt in due course cacao will receive more attention, as rubber is already doing.

The Royal Horticultural Society's Exhibition of Colonial Fruits and Vegetables.

To be Opened by Royalty.

Her Royal Highness the Princess Louise, Duchess of Argyll, has graciously consented to open the Royal Horticultural Society's Exhibition of Colonial-grown Fruits and Vegetables at 12.30 p.m. on December 1st, at their Great Hall in Vincent Square, Westminster. Her Royal Highness will be accompanied by His Grace the Duke of Argyll, K.T., G.C.M.G., G.C.V.O. A splendid exhibition is being arranged, and the various Colonies are endeavouring to be represented according to their respective climatic abilities at this time of year. The hardy fruits of Canada and British Columbia, already so renowned, will be displayed in all their well-known excellence and beauty; the West Indian Islands, with their tropical and sub-tropical fruits so suggestive of warmth and luxury of climate, will display their bounty; and New Zealand, Victoria, and South Africa are to show their resources. Other entries will no doubt be forthcoming in a few days' time, and information concerning them will be made public. Free cinematograph displays at frequent intervals will be given, with lectures, and on December 1st, at 3 p.m., Mr. Robert Newstead, A.L.S., F.E.S., of the Liverpool School of Tropical Medicine, will deliver a lecture on the West Indian Insect Pests. It is hoped that these many attractions will draw together a large attendance of exhibitors. As the Society makes no profit whatever on these Colonial Exhibitions, but rather on the contrary a loss, we trust that our readers interested in the raising of tropical fruits will become subscribers to this Institution that is doing such excellent work to introduce and push the sale of their produce on this side.

Our friends, the Caravonica Cotton Plantations, of Bombay, write as follows: "In reply to your query we have sent our cotton-seed to all parts of the world. Our plantation is of course a new one, and we cannot pretend to say what the effect of the introduction of the seed is as regards other plantations in the district; but we have supplied considerable quantities of seed to growers in Central Africa, and we have also had enquiries from the West Indies. We may mention that we are growing this season a small crop of Sea Island cotton, and in the course of next month or so we hope to be able to judge better as to the out-turn, as the cotton is coming into boll."

Tropical Diseases.

In accordance with the recommendations of the recent Departmental Committee on the West African Medical Staff, the Colonial Secretary has appointed the following to be an advisory committee on medical and sanitary questions connected with the British Colonies and Protectorates in Tropical Africa :—

Mr. H. J. Read, C.M.G., of the Colonial Office (chairman).

Sir Patrick Manson, Senior Lecturer, London School of Tropical Medicine.

Sir Rubert Boyce, Dean of the Liverpool School of Tropical Medicine.

Mr. C. Strachey, of the Colonial Office.

Mr. W. T. Prout, late Principal Medical Officer, Sierra Leone.

Dr. Theodore Thomson, of the Local Government Board.

Mr. W. J. Simpson, Professor of Hygiene, King's College, London.

Mr, J. K. Fowler, M.A., M.D., D.Sc., F.R.C.P., late Dean of the Faculty of Medicine, University of London.

Mr. A. Fiddian, of the Colonial Office (secretary).

Professor W. J. Simpson was "Our Friend," in the August (1909) issue, and wrote some of our articles on "The Economic Value of a School of Tropical Medicine."

Engineer (A.M.I.E.E.), lately engaged with a well-known firm of contractors, and possessing great experience in rubber, is open to entertain offers of employment in any part of Latin America; knows Mexico thoroughly. Perfectly competent to survey and map out fresh country, in Mexico or elsewhere, showing routes for travel and exploration, with a view of ultimate development of same.

Mr. Michael P. Maillard, a well-known estate owner and dry goods importer of Trinidad (West Indies), freely advertised his store, one of the best assorted in the island, in the earlier numbers of Tropical Life, in order to attract thence the American and European readers of Tropical Life. This mail now brings us the first of a monthly magazine that Mr. Maillard has started, as an auxiliary to his extensive press advertising campaigns, believing that what Sir George Newnes did with his journal when in business, *Maillard's Mail* will do for him. We are pleased to see this latest rival in the tropical press world, and wish our contemporary, and its enterprising owner, a long life and every success.

In the report of a recently floated rubber company to work an estate situated in South-east Borneo, on the Riam Kuva River, it was stated that some 8,000 ficus trees were planted 7 to 8 metres apart (1 metre = 39·37 in.), the parent trees having originally come from the Botanical Gardens in Buitenzorg, Java. Planting Tephrosia and Crotalaria has given good results in keeping down lalang grass. It is to be noted that in this instance it was recommended not to plant tapioca or other catch-crops, as they impoverish the soil and demand much labour, besides encouraging visits from pigs, deer, &c., whilst their work, to keep down lalang, can be done more cheaply by Tephrosia and Crotalaria, which, although they may not yield direct profits in the shape of crops, improve the soil (instead of exhausting it) both mechanically and chemically, by giving shade and nitrogen to the ground, and by preventing the soil from becoming hard and caked.

Re Cacao Fermentation.

By Dr. Axel Preyer.

(Translated by permission of *Der Tropenflanzer*, by Mr. Victor Hamel-Smith.)

Part II.

Lastly, let us glance at the methods generally in use in Ceylon. The system of the three tanks is seldom met with. Most of the planters ferment their cacao in covered heaps, and thanks to this and the care they take in drying, the cacao is of excellent quality. Let me describe in detail the entire process of preparing the cacao as practised on the Gangaroowa plantation near Peradeniya :—

The ripe cacao pods are opened by the Tamil women as they are brought in. This is done by first cutting the pods crossways by means of small knives fixed in a clumsy wooden handle, after which they are broken by light blows, and the contents collected in baskets. The empty pods are then taken to the compost or manure heaps. The various qualities met with (Forastero, Criollo, and wild varieties) are not separated, but the fruits attacked by canker or otherwise diseased are carefully picked out and fermented apart. As soon as about 100,000 pods are opened, their contents are placed together in a heap on a covered in cement floor, which has a slight gradient and outlet. The latter is like a truncated cone, and is formed and polished by beating with short wooden spades. Then the heaps are at once covered with double layers of banana leaves, over which damp jute mats are spread, whilst outside the heap is covered with a layer of moist earth, 3 cm. to 5 cm. thick. The mats and the earth are used again and again until a renewal is necessary. Thus heaped up, the cacao is left from five to seven days to ferment, but every other day the covering is taken off, the heaps stirred round, and again covered over as before. The liquid percolates through the bottom. The fermentation goes on slower in damp weather than in dry; on the other hand, a certain amount of moisture is necessary for fermentation. If the air gets in owing to the faulty covering of the heaps, decomposition and discoloration of the seed shells take place. The fermentation is ended when the outer pulp of the cacao bean is so far loosened that it can be removed in the succeeding washing. The pulp of well-fermented seeds comes away in the washing in small particles, not in long, slimy threads. The washing itself takes place in small baskets, smooth inside; made from perforated palm leaves, these are filled with the beans which are washed with a large volume of water with not too strong a flow, often shaken, and finally transferred to a large wash-basin. All this takes place very quickly, and a thorough cleaning of the bean is obtained without any damage. The washed seeds are dried in wet weather in layers in a drying-house by artificial heat; on sunny days they are carefully spread out in the open on coco-matting, so that no two beans lay one on the other. At night the whole is brought under shelter. After three or four days the cacao is ready for sale, and sold as soon as possible: this refers to the preparation of first-class Ceylon produce. Colouring the beans is never resorted to.

On other plantations in the island modifications of the methods described are in use; thus the heaps are made larger and higher, and, owing to a higher temperature, are fermented in two or three days less. One planter prefers to make the heaps pointed, and not round; others prefer rounder shaped heaps.

In cacao fermentation there are many widely divergent reports as to the development of heat, as well as the smell of the fermented mass and the dispersion of the liquid. A short enumeration of the reports of the various authors are shown in the following :—

Author	Method of Fermentation	Temperature	Smell
Aublet ..	Cask without outlet (Guiana)		Wine-like, fluid wine like, slightly acid.
Chittenden ..	Several samples fermented well at ..	80° F = 26-7° C.	Like beer-wort.
,, ..	With the usual Trinidad methods	115-120° F. = 46-49° C.	
Morris ..	With the usual West India methods ..	About 140° F. = 60° C.	
Strickland ..	Three-tank system, West India		
,, ..	In tank 1	Not over 115-120° F. = 46-49° C.	Pleasant vinous smell. Wine fermentation.
,, ..	,, 2	Not under 95° F. = 35° C.	Acid milk fermentation.
,, ..	,, 3	Do.	Butyric acid
Semler ..	General rules ..	Never over 60°C. Best at 50° C.	
Friederici ..	Three-tank system, Cameroons		
,, ..	In tank 1	30-33°C.	
,, ..	,, 2	35-38° C.	
,, ..	,, 3	Not over 43-45° C.	
Preuss ..	Three tank system, Surinam	Never over 45°C.	
Preyer ..	Heap method (Ceylon)		On second day like inferior wine must.
	In the upper half ..	30-40° C.	On fourth day strong alcoholic, like inferior wine.
	,, lower ,, ..	Outside temperature up to 30° C.	The off-flowing liquid like fermented and sour milk.

Continued trials in cacao fermentation are only met with in isolated cases, and in Chittenden's prize essay is found probably the only attempt at an explanation of the fermentation processes. The author says as follows : "Unfermented cacao yields the same analytical results as fermented, although it has been said that a slow oxidation and formation of new matters take place. If the fermentation is properly carried out, the cotyledons are separated from each other, and the wine-like fluid of the pulp which forces itself through the membrane husks fills the hollow space as well as the intermediate space between the solid particles. This is what shows such a physiological influence, and on which depends the aroma, whilst the beans to a certain degree are stewed in their own sap. Further, the osmose through the seed shell in the fermentation is easy to demonstrate by the insertion of the fermented beans in fuchsin solution. This also, after the drying of the remaining hollow spaces, which makes an elastic pressing together of the shells possible, is a sign of a properly finished fermentation. The different claims of the various cacaos are dependent on the amount of the fats of same. Con-

cerning Strickland's tank methods, it may be further said (in tank 1) there is wine fermentation owing to *Saccharomyces cerevisiæ*, and probably at the same time milk fermentation (*Pencillium glaucum*). Brought into tank 2, the cacao shows an acid reaction; further lactic acid fermentation takes place in a lower temperature. The lactic acid will later (in tank 3) change into butyric acid, after the formula — $2C_3H_6O_3 = C_4H_8O_2 + 2CO_2 + 2H_2$. The pleasant smell disappears; butyric acid is also traceable."

Decomposition easily sets in with formation of nitrous acid and nitric acid, as well as injurious gases. Further, Chittenden recommends in case of defective fermentation a repeated fermentation with the addition of some invert sugar and yeast.

(*To be continued.*)

The Soy or Soya Beans.

(*Glycine hispida.*)

Twelve or twenty months ago, we came across paragraphs or items of news about soy beans, as seldom as we did about Tonca beans; to-day, each month brings us columns of matter on the subject, until every fact concerning this most useful plant must have been published.

The bean, as the London *Daily News* pointed out, has even been cultivated for some little time on this side in some of the Southern Counties under the auspices of the Board of Agriculture, and it has long been familiar by name to British cooks, because it furnishes the condiment called "soy," which forms an ingredient of several soups and sauces. It is considered the most nutritious of all leguminous vegetables, and contains a large proportion of oil—about 18 per cent.—which adds greatly to the commercial value.

Two or three varieties of this bean have been cultivated in China and Japan from time immemorial, but its cultivation is rapidly spreading to other tropical and subtropical countries. During the late war the Japanese vastly relieved the work of the Commissariat Department by using soy beans, both as rations for their soldiers and fodder for the horses. The beans can be cooked in the green pod, like French beans, or the dried beans may be treated like haricots.

Our Consul at Vladivostok (Mr. R. M. Hodgson), writing on July 31, reported that the prospects of the present crop of soya beans in Northern Manchuria are very favourable. The beans were in flower on that date, so that it is early yet to predict with any certainty the quality of the harvest, but all advices so far are to the effect that, unless spoilt by the late heavy rains, the crop should be a particularly good one. As to its probable amount, there is much difference of opinion; a considerably larger area than usual has been planted, and the most trustworthy reports point to a crop from 20 per cent. to 50 per cent. larger than last year's being expected. This would mean a total of from 1,000,000 to 1,400,000 tons. It was then being offered at 32 copecks per pood (about 2s. 1d. per cwt.).

The export through Vladivostok of the 1908 crop is not yet entirely finished, some 20,000 tons still being stored there for shipment. The amount sent to Europe through Vladivostok so far has been 180,000 tons, and the greater part of this has been for the English market, although one full cargo went to Hamburg, and various small consignments to Scandinavian ports. The price, at the time of writing, was 72 copecks per pood (4s. 8d. per cwt.) f.o.b. Vladivostok.

Mr. E. Edie, M.A., B.Sc., has issued through the Institute of Commercial Research in the Tropics, attached to Liverpool University, a very handy little Bulletin on this bean (price 6d.), in which he points out, quoting Bulletin No. 98 of the Bureau of Plant Industry, U.S.A., that there are over twenty varieties of the soya beans (elsewhere we are told that the different varieties number 200), and analyses of four samples, apparently distinct varieties, worked out as follows:—

Moisture	..	11·17	9·91	10 62	[1]10·52 per cent.
Oil	.. ..	16·76	16·54	18·11	17·26 ,,
Albuminoids	..	40·46	41·17	37·07	36·05 ,,
Carbohydrates	..	21·45	22·81	24·46	26·16 ,,

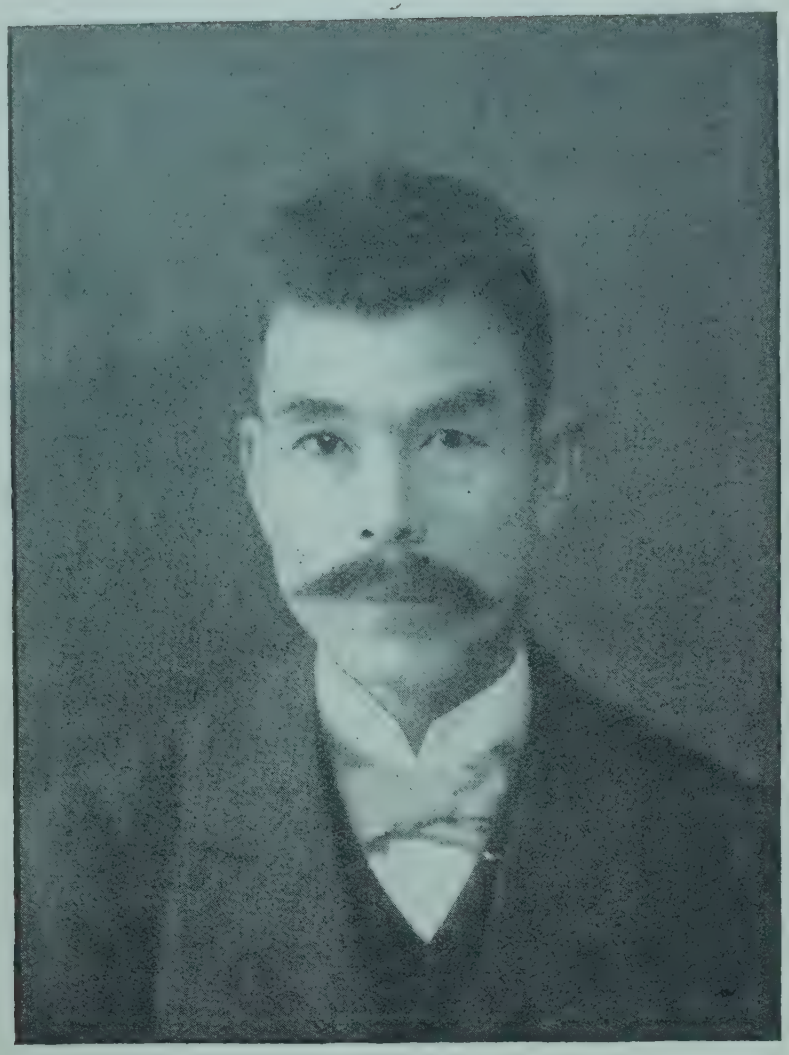
As a leguminous plant, for soil fertilization the bean must be important, as it contains a high percentage of nitrogen. In Japan it is sown between two rows of maize. This method, Mr. Edie very correctly points out, could no doubt be used with equal success on cotton estates. Under ordinary circumstances the plant requires less cultivation than maize. An acre requires ½ to 1 bushel of seed, and from 25 to 100 bushels of seed are spoken of as the crop, according to the land, but yields over 50 bushels need confirming. For beans (as opposed to fodder) five or six seeds per foot run should be planted, and the rows should be wide enough apart to allow for cultivation.

The most favourable soil seems to be a medium one, containing phosphoric acid, potash, and lime. The land must be well cultivated before sowing. If the soil lacks potash or phosphoric acid, they must be added.

Whilst it yet remains to be proved conclusively that the feeding value of soy bean meal is as economical a cattle food as (much more so if it is cheaper than) cotton seed and other meals, experiments tend to show that the meal is somewhat superior to cotton-seed meal in the production of pork, mutton, and milk, and is slightly (about 10 per cent.) superior to middlings in feeding hogs. Trials in America show soy bean hay to be about equal, even superior, to alfalfa (lucerne) for milk and butter production. Improved results in favour of soy bean hay were represented by 245 lb. of milk, and 20·5 lb. of butter fat, and its feed value compared with others were maize, $14; Kaffir meal, $13; soy bean, $25 a ton or 75 cents. a bushel. The relative value of the oil has still to be determined. Generally speaking, the soy bean is said to require about the same temperature and class of soil as maize. Rich soil gives more hay and less seed, poor soil the other way round. The greatest care must be taken to buy the best variety for planting, as it is said that there are over 200 varieties, of which less than seven seem to be "the best," and these are likely to replace all others. Estimates of yield vary. Certainly 20 bushels an acre can be relied upon even on poor soil, and 50 bushels may be obtained from small areas; but when reported yields of 100 bushels are mentioned, we are told that this needs confirming.

The Imperial Institute, always on the alert to push the interests of this country, has already brought the matter of soy-bean cultivation to the notice of various Colonial Governments, and experiments are now in progress at the Cape of Good Hope, Natal, East Africa, and the Gambia.

[1] This sample was of the yellow variety, but grown in West Africa. "The analysis shows," claims Mr. Edie, "that in the first season at least the soya bean underwent no deterioration in West Africa."



"Tropical Life" Friend.—No. 53.

Mr. IIDA SOHICHI,

Our Authority on Camphor Cultivation.

IN our December issue, readers of TROPICAL LIFE will doubtless remember that we published some interesting and most instructive notes on "Camphor and its By-products," which "Our Friend" this month very kindly translated, and adapted for us from a Japanese Government report on "The Forestry and Forest Products of Japan." At other times and with other articles which we have published, Mr. Iida has very kindly placed his exhaustive knowledge on this article at our disposal. As head of the Yokohama Nursery Company he has had constant opportunities of studying the matter, and, being a considerable traveller and a good linguist, has followed all that has been written on the subject in most languages. It was "Our Friend" who sent us the unique photo of the Formosan aborigines that we published in our issue of February, 1908.

Mr. Iida's letters are always instructive and most explicit. In front of us we have one of his cards printed on very thin wood—thinner than many ordinary visiting cards. On it is printed his name and full address—in English on one side, in Japanese on the other. On the English side, under his name, he explains that Iida is pronounced Eeda, and this is his family name; whilst Sohichi, although the last of the two, is his "given name."

"Our Friend" was born in May, 1856, and has had a career that would have interested Lafcadio Hearn. At the age of 15 he set out, he knew not where, to make his fortune with 10s. in his pocket. Even to obtain this, sacrifices had to be made, and his father sold some heirlooms to obtain it. Thanks to the old gentleman's sacrifice—for all good Japanese feel parting with such things very deeply, the son got a chance, and, making the most of it, succeeded in making his way, and was able to recompense his father in his old age. "Later on, I was able to amply pension my parents off," he wrote to us.

Mr. Iida certainly learnt much. We know that he is a student of conchology, whilst about bulbs and Japanese plants he is, of course, well versed. For twenty-five years he also carried on the trade of a manufacturer of leather-paper in Tokio, and it was only owing to ill-health that he gave it up and devoted all his attention to managing the Yokohama Nursery Company, with which he had also been connected for twenty years.

Friends who have met Mr. Iida in New York, and elsewhere, speak of his great general knowledge and kindly and courteous disposition. We have not yet had the pleasure of making "Our Friend's" personal acquaintance, but from the letters that we have received from him, and the many ways that he has helped us in our work, especially in connection with Japanese products, we can certainly echo this opinion.

Dr. and Mrs. Olsson-Seffer, when visiting Japan in the course of their journey round the tropical zone, visited Yokohama, and on being shown round the nurseries by Mr. Iida were also struck by their host's technical knowledge on agriculture, &c. The gardens, which are situated in a suburb outside Yokohama, Dr. Seffer tells us, are laid out on the hillsides, stretching away down into the valley below in a most picturesque manner. The gardens were most artistically laid out, and although the wisteria was not in bloom, the chrysanthemums were, creating an effect even more picturesque in real life than that depicted in Japanese art.

THE USE OF THE MOTOR BOAT.

ACCORDING to the *London Chamber of Commerce Journal*, a local lumber manufacturer on the St. Lawrence River has ordered a 25 h.p. motor launch (or tug) for towing lighters to and from the ocean steamers lying out in the channel. This is the first instance where these have been tested, and should results be favourable there is no doubt many motor boats will be used. The gasoline engines are also utilized by farmers in connection with threshing and fanning mills. Nearly all of the engines in use are of American manufacture. In Tasmania prospects appear favourable for marine motors coming into almost general use in the harbours and navigable streams of Tasmania, and there is a good opening for business if placed in the hands of good agents and offered at popular prices. What is wanted is a reliable engine, the slow running engine of about 400 revolutions per minute coming into particular favour. The business in Tasmania could well be combined with that in other Australian States which are favourable to a larger use of motor boats, as, for instance, New South Wales, Victoria, and Western Australia.

It is also reported that the Japanese Government proposes to create a postal motor service connecting the principal towns of Japan. In face of these and similar reports from other centres, we hope to be soon seeing motor boats in general use on the Latin American rivers, in West Africa, and elsewhere.

Business Notices.

1.—The address of Tropical Life is Messrs. Bale, Sons and Danielsson, Ltd., 83-91, Great Titchfield Street, London, W.

2.—All **literary communications** should be addressed **to the Editor,** and accompanied by the necessary stamps for their return if not accepted.

3.—All **business communications and payments**, either for subscriptions or advertisements, should be sent **to the Publishers** of Tropical Life. Cheques to be crossed The Union Bank of London, Ltd.

4.—The Subscription, which is **Ten Shillings** per annum, may commence at any time, and is payable in advance.

5.—The Advertisement Department is at 112, Fenchurch Street, E.C., where all enquiries respecting advertisements, charges, &c., should be addressed to the Manager of the Department.

6.—Changes of address should be promptly notified.

7.—Non-receipt of copies of the Journal should be notified to the Publishers.

8.—The Journal will be issued on or about the twentieth of the month.

The Managing Director and Editor of "Tropical Life" will be pleased to consider the printing and publishing of useful technical works on Tropical Agriculture, Medicine, or other subjects dealing with the development of our Colonies and the Tropics generally.

Tropical Life.

November, 1909.

Manuring of Mulberry Trees in Japan.

The mulberry, whose leaves are used to feed the silkworms, is the basis of the silk industry which is so important to the economy of Japan. During 1908 the exports of raw silk, silk tissues and silk goods amounted to yen 148,255,000 (say £15,000,000), and though the money value of the 1908 export was below that of the two previous years the quantity was greater. Besides this foreign trade in silk there is a very large internal demand to be satisfied. Yokohama is the centre from which nearly all exported silk goes, and the supply reaches there from many sources. The mulberry and silk industries are found in the majority of the prefectures, but in Nagano, Fukushima, Gumma, Yamagata, Yamanashi, Aichi, Ishikawa, and Fukui, they may be regarded as their prime industries. For raw silk the best customers are the United States, France, and Italy; for *noshi* and *kibiso* (thread) France and Italy; for *habutæ* Great Britain, United States, France and British India.

Much encouragement is given by the Department of Agriculture and by local authorities to increase the area devoted to mulberry growing, and varying small subsidies are granted for that purpose. The method of growing the mulberry varies from district to district, but in the most advanced system the plant is kept dwarfed and the production of leaves and young shoots forced to an amazing extent to supply two, three or more pickings per annum. Wide differences are found in the yields of leaves per tan (¼ acre), according to the method of culture, the number of pickings, the manuring practices, and the local conditions of soil and climate. Nearly all Japanese schemes of manuring are based on the somewhat old-fashioned plan of determining by analysis the plant food ingredients removed by the crop, and calculating back the necessary quantities of manure. Very little experiment work has been carried out towards adjusting the proportions of the three common manure elements to the specific needs of the separate crops. Different figures are given by different analysts for the manurial items removed.

Nitrogen	·636 to ·768	per cent.
Phosphoric acid	·100 ,, ·189	,,
Potash	·413 ,, ·512	,,

Evidently schemes of manuring built up on these analyses must be predominantly nitrogenous, and since the product aimed at is the vegetative portion of the plant this must necessarily be the case. Both in practice and in experiments it is possible to think that the importance of phosphoric acid and potash in maintaining the health and strength of the plant under the trying conditions of forced culture has been a little minimized if not overlooked. All kinds of nitrogenous manures are found in use, silkworm dejecta, rice bran, herring guano, bean cake, rapeseed cake, sesame cake, sulphate of ammonia, nitrate of soda. Speaking generally, one would class Japanese soils as light or medium, and in the rotations practised there is nothing corresponding to grass, clover and pasture to renew the soil store of organic matter. Continuous cropping is practised, though to a limited extent green manure crops may be found growing. Animal manure, farmyard manure, stable manure, is very small in total amount for the whole country. The farmers therefore fall back on purchased organic manures to supplement the very limited supply of home-made nitrogenous wastes, such as silk worm waste, rice bran, compost, night soil, &c. Equally they are now realizing the need for and the importance of chemical manures in spring and during the summer, in order to secure timely and maximum leaf production. One of the most critical problems is to secure leaves in appropriate time, and conditions adjusted to the hatching and subsequent growth of the silkworms. A late spring frost, a hailstorm or other calamity may spell ruin, and even when these do not occur the farmers have some sleepless nights at times in regulating the temperature of the hatching-room and controlling the coming out of the worms. The importance and beneficial action of nitrate of soda for spring growth is beginning to be realized in this connection. Experiments show that damage by frost does not occur, or occurs only to a very limited extent where nitrate of soda has been used, and frost damage is most quickly repaired by the timely application of the same manure either in water solution or as a dry top-dressing. Even though frosts do not interfere with the young mulberry growth, it must be borne in mind that the spring climate is a little trying and variable in the Japanese mulberry areas and frequently in times of low temperature leaves suffer from a "shrinking disease," partly caused by the cold interfering with the plants' nitrogen supply where only organic manures have been used.

In autumn or winter it is customary to trench the soil along the mulberry rows to a considerable depth, and at that time part of the manure is applied. Another portion is given in the spring before growth begins, and up to the first picking a top-dressing is added as required. Additional manuring is in order after each picking. The quantities of leaves obtained and the practices of manuring vary so much that a general statement in this short space hardly conveys enough detail to be instructive. Where manuring is reasonably practised yields of 300 kwan per tan (1 kwan = 8¼ lb.; 1 tan = ¼ acre) are common; 400 to 500 kwan can easily be raised, while individuals record much greater yields where the pickings are many in number and the culture very forced. To meet the circumstances there must be considerable latitude allowed in the quantities

of purchased manure used. Taking bean cake (6·6 per cent. nitrogen) as the typical organic manure, we give the subjoined quantity limits as meeting the requirements of the crop and representing the newer practice.

20–35 kwan bean cake	per tan
4–7 kwan superphosphate	,,
7–10 kwan nitrate of soda	,,
6–10 kwan wood ash	,,

As already stated, any home manure-like compost, green manure, or rice bran, is usually applied at trenching time, in autumn or winter. Before growth starts in spring, one-half of the bean cake, 3 to 4 kwan of nitrate of soda, the superphosphate and wood ashes, should be worked into the upper surface of the soil. When growth has started a top-dressing of 2 to 3 kwan of nitrate is very advantageous. If moisture be deficient, good results follow the use of a solution in water of the requisite quantity of nitrate. When the nitrate is applied dry it may be mixed with earth, sand, rice bran, or other material, to secure even distribution. After the first picking it is usual to apply the remaining half of the bean cake as a summer manure, and another top-dressing of 3 kwan nitrate of soda is suitable and profitable. Where a larger number of pickings is made and the quantities of manure are greater more subdivision is made. Frost, hail-storm or insect damage may call for supplementary dressings of night soil or nitrate of soda. The small areas controlled by each grower allow the closest attention to be given to details of the manuring. In dry weather the mulberry grower may and does use the waste water from the daily bath of himself and his household as a liquid top-dressing with good results. Alike in growing the mulberry and in rearing silkworms there is need for the keenest attention to details by a persevering, frugal and industrious peasantry; and to a very high degree this is found in Japan.

The Awakening of Brazil.

BRAZIL is wisely striving to attract attention to the other possibilities that she has to offer as a producing centre to the enterprising planter and colonizer besides rubber, cacao, and coffee. These three are very valuable assets, and the Portuguese-speaking Republic is most fortunate in possessing three such industries to a degree unequalled by any other country. For all that, Brazil is wise to try and still further distribute the risks, by encouraging other industries, commercial, manufacturing and agricultural. In order to further this, the Federal Government, as well as several of the individual States, have issued some really splendid specimens of the printer's and bookbinder's art, in the shape of the three following large volumes giving an account of the resources of Brazil, and how these can be further developed. These books are:

"Album do Pará," in 1899, *re* the Administration of Dr. Jose Carvalho as Governor, with many photographs by F. A. Fidanza, and descriptive matter by Dr. Henrique Santa Rosa (in Portuguese, Italian and German).

"Album do Estado do Pará," being an account of the eight years administration of that State by H. E. Augusto Montenegro as Governor from 1901-1909 (succeeded by Dr. João Coelho on February 2nd, 1909). Published by Chaponet, Paris, Rue Blanc 7. Large 4to, pp. 350, in cloth with embossed coloured cover. In three languages—Portuguese, French and English, with many illustrations, portraits and maps.

"Album do Rio Acre," edited by Dr. Emilio Falcão, printed by the Typographia do Annuario Commercial, Lisbon, with 125 full-plate photographs by Messrs. Pires, Marinho y Cia., Lisbon, printed in Portuguese only. The photos include scenes on the Rio Acre, the Tocantins, Tapajos River, &c., with views of the seringals, the collection of rubber, its shipment, &c.

A fourth book, but of small size to go into the pocket as a guide, and it is a very good guide, has also been received, viz., "Brazil in 1909," by J. C. Oakenfull. This we shall refer to next month as well as to "Brazil of To-day," by Arthur Dias, translated into English by Louis Raposo (Laemmart and Co., Rio).

None of the three first-mentioned books seem to have been issued for sale, as we find no price marked or mentioned. The books show what tremendous strides navigation has made in the interior of Brazil, and further how easy it would be, for our suggestion to be carried out of utilizing motor boats carrying a self-contained supply of fuel, to traverse Brazil from end to end, and side to side, at a proportionately low cost for fuel. Ocean-going steamers can, of course, easily penetrate as far as Manaos, whilst from thence to Iquitos (in Peru) it is claimed that ships of 2,500 and 3,000 tons would find sufficient depth of water to navigate without trouble. As a matter of fact, ships are now plying between Liverpool and Iquitos *via* Manaos and the Amazon. As soon as the ordinary American or European capitalists realize how easily the very heart of the rubber country in the State of Pará can be reached, and how much more healthy it can be made when opened up and some regard to modern sanitary law observed, both labour and capital will be in as great a hurry to preserve and to further plant out the hevea along the Amazon and her main tributaries, as elsewhere, whilst at the same time, instead of sending up at an enormous cost every ton of food now consumed by the rubber collectors, no matter how far up the river the seringal may be, lands will be planted out and supplies will be drawn from the spot. If this is done, and adequate labour, for which there is both room and money, is drawn to rubber belts, Brazil from all accounts will more than hold her own against the East as a rubber producer, besides which the opening out and permanent settling and planting up of the lands will create a much greater demand for manufactured goods from the rubber-consuming centres. At present the rubber collector, on whom Brazil's rubber trade is entirely dependent, is content with a hand-to-mouth existence, and to pay two or three times the cost of the few goods he buys. Were the country made more easy of access, and supplied regularly with goods at a fair margin of profit sold on more of a cash basis, the demand would increase enormously and the trade both of Parà and Brazil benefit as well as those countries who buy their rubber and ship back manufactured goods to them in return. We are in the habit of talking of the "awakening of China"; the hinterland of Latin America is in some respects behind the times to a far greater extent than China really is (whatever she may seem to be), but in Brazil, as in China, signs are not wanting of a break in these clouds of darkness, and it behoves England in both cases to see that she gets her share of the increased trade that is certain to accrue to those countries who have the enterprise to act as leaven to modern Brazil and help force on the fermentation without which the expansion of this vast Republic's agriculture and commerce cannot become possible.

Improved Agricultural Methods for India.

The Coming Allahabad Exhibition.

The organization of the Agricultural Court of the United Provinces Exhibition, the *Madras Weekly Mail* tells us, to be held at Allahabad in December, 1910, is now in active progress, under Mr. B. C. Burt, the Deputy-Director of Agriculture. It is particularly desired that the Exhibition shall secure a good display of small scale processes for working up agricultural products. Efforts will be made to show the machinery and appliances at work as much as possible, so as to attract and really interest the agriculturists, large and small, in the exhibits, and through seeing, to induce the visitors to try them. To further encourage this, the produce necessitating the use of the various ploughs and machines will be exhibited as far as can be arranged in close proximity to the implements, &c. One of the leading features of the Agricultural Court will be the tillage-field, on which as large as possible a choice of ploughs and other implements of tillage will be regularly at work, so that visitors can see for themselves the depth and quality of the tilth, and the weight and draught of the various implements. Near the tillage-field will be the water-lift section, where it is hoped to show a larger selection of lifts for irrigation than has ever been brought together in India, ranging from pumps worked by a couple of coolies, through various forms of bullock-lifts, to power pumps of different capacities. These will, it is hoped, be installed on an artificial lake which will be fed from the Jumna by still larger pumping machinery, such as wealthy landholders might profitably instal on lakes or rivers; while on the adjoining tillage-field facilities will be given for showing the area that a particular lift will irrigate in a given time, a point of more immediate interest to ordinary visitors than any figures of the quantity of water lifted or of the power consumed.

Next will come the series of sections dealing with produce, the cereal section, the sugar sections, the oil-seeds section, the fodder section, and so on. In each of these the same general arrangement will prevail, the raw and finished produce being exhibited alongside of the machines which are intended to convert the one into the other. Thus in the cereal section it is hoped that visitors interested in wheat or flour will be able to see not only the best types of wheat and flour that the Province can yield, but also the milling machinery actually producing the flour, and other machinery converting some of it into biscuits, macaroni, vermicelli, and other products. In the oilseeds section again it is hoped to show oil-mills of various sizes at work close to the display of seeds and oils; while in the sugar section the aim is to show the working of a variety of machinery from complete factories able to deal with the cane crop of an ordinary village or group of villages down to appliances within the reach of individual cultivators. Still following out the same idea, there will be a working dairy with everything complete from the cows to the butter, and a poultry farm where the methods of rearing, housing and feeding poultry can be studied at work; and generally speaking, the arrangements will be such that any landholder, capitalist, or man of enterprise can study on the spot the details of anything that may arouse his interest.

"Conditions are improving in India," states *Capital*, "in favour of the adoption of agricultural machinery on an increasing scale. Proprietors are forced by the increase in wages to adopt agricultural machinery; then purchasing power and credit are increasing as a result of co-operation; and lastly, the agricultural departments spare no pains to make known to all concerned the results of their numerous experiments. There is, therefore, a good prospect for makers of agricultural machinery finding in India an excellent opening through the medium of capable agents."

Such a report as this should encourage plough and implement engineers to be represented at the Allahabad Exhibition. As well-wishers for the future of the agricultural industries in India, we trust that such praiseworthy efforts to raise the status of the agriculturist in India will meet with the success that it so fully deserves, and thus encourage other centres to follow the excellent example set by the Deputy Director of Agriculture of the United Provinces.

The Rise in the Price of Hides.

Those of our planting friends who have cattle on their lands will be interested to hear that in the press notices, published in connection with the Shoe and Leather Fair held recently in London, we are told that all kinds of leather are to-day from 25 per cent. to 30 per cent. dearer than they were a year ago. The bulk of the increase has occurred within the last three months.

An important reason for this has been the change of conditions in America. The grazing lands of the large ranchers are being gradually devoted to the raising of cereal crops of some kind, with the result that the quantity of cattle reared in the United States was not proportionate to the increase in the population.

This has been further confirmed for some time by the fact that the exports of meat and cattle from the United States show a tendency to decline. America even has been adding to her imports of hides and cattle products from other countries, notably Argentina.

The removal some three months ago of the American import duty on hides also affected the leather trade. For twelve years until last August raw hides imported into the States were subject to a duty of 15 per cent. Since the removal of the duty, American buyers have been busy in the world's markets, so that smaller supplies were left for the European tanners.

All these causes, on the top of an increased demand on this side, have caused prices of hides in England to advance about 30 per cent., and for some qualities as much as 40 per cent. The growth of motoring has also been responsible for the use of a great deal more leather than formerly. An ordinary motor-car takes at least three hides to upholster it, whilst the driver is usually clothed in leather, and the demands thus made upon the market for raw material have helped to accentuate the scarcity.

Jamaica and other of our West India Islands could with advantage raise more cattle. The manure is good for the estate, and the flesh for food. Trinidad alone has imported an average of 1,400 head of cattle a year during the past five years, all of which might surely be raised in the Island. Meanwhile, the price of hides, as well as of beef, seems likely to remain high for some time.

Agricultural methods in Egypt are undergoing great changes. In the last six years, states our Vice-Consul at Alexandra, over one hundred and fifty sets of a patent steam plough of British make have been sent to Egypt. Each set consists of two engines and one cultivator, and is capable of ploughing 20 feddans or about 21 acres a day.

New Issues.

"HOUSEHOLD PESTS AND HOUSEHOLD REMEDIES." By W. R. Boelter. Pp. 172, with 86 illustrations. Price 2s. 6d., post free. John Bale, Sons and Danielsson, Ltd., 83-91, Great Titchfield Street, Oxford Street, London, W.

Mr. W. R. Boelter, the terror of the rat world, and the prime mover of the present campaign against this most mischievous and plague-spreading nuisance (in Madras alone, since the present operations were started, over 900,000 rats have been destroyed), who has already published "The Rat Problem,"[1] "A World's War against the Rat," "A Lesson in Economic Zoology," &c., has now declared war against other pests that infest tropical and temperate zones alike. His "Household Pests and Household Remedies" will do much to help those willing to give his suggestions a trial, to rid themselves of such pests as ants (white, yellow and red), beetles, fleas, bugs, jiggers, lice, and mosquitoes, &c., as well as his old friends the rats and mice. The book, like his "Rat Problem," is by no means dry reading, but if Mr. Boelter cracks a little joke here and there none can find fault with him, for it goes a long way to make a most unpleasant subject far less disagreeable to study than would otherwise have been the case, whilst so far as we can judge the remedies suggested are as simple and easy to carry out as they are efficacious, and the book throughout shows an exhaustive knowledge of the subject. In the chapter on mosquitoes the question of utilizing the little Barbadian fishes known as "millions" is fully dealt with. The illustration of a rat-hole trap and how to make it with sloping sides will appeal to many cacao and other planters who still insist on digging holes in the ground to catch rats.

Rubber in Ethiopia.

ACCORDING to official reports on the trade of Abyssinia for 1907-08, the exports of rubber *viâ* Jibuti were insignificant, nearly all the rubber produced being exported *viâ* the Sudan. There are enormous possibilities in the rubber industry, the vines growing wild over vast tracts of land in the west and south. The monopoly for collecting rubber was formerly in the hands of the Imperial Ethiopian Rubber Company, which did good work in teaching the natives how to tap the vines, and which had also started extensive plantations and established agencies in various parts of the country. Early in 1908, however, its concession was cancelled without any compensation being given, and the industry is now controlled by an Imperial *régie*, which has reduced the prices offered to the natives for collecting the rubber; as far as can be ascertained the quantities now brought in are considerably less than before, and the vines are tapped in the most reckless manner.

Elsewhere the report states that there was an industry in connection with fibre from the *Sanseivera Ehrenbergii*, which grows everywhere in the lower plains from Dire Dawa to the Hawash River, but it seems that this industry, which was established at Dire Dawa, died unsuccessful.

Both cotton and tobacco grow very well there. An Arab has made an experiment with Homumi (of Hadramut) tobacco, and has succeeded very well. Cotton grows very well everywhere, and especially in the lower plains.

[1] "The Rat Problem." John Bale, Sons and Danielsson, Ltd., as above, price 3s., post free.

Rubber from the Banana Plant.

CAN IT BE PRODUCED COMMERCIALLY?

ACCORDING to the *Daily Chronicle* of Georgetown, British Guiana, Mr. George C. Benson, who is said to have already achieved some success in the extraction of rubber from the banana plant, and is in hopes of converting his methods into a practical commercial undertaking, sends the following particulars with regard to the banana rubber and the position to which his investigations have thus far carried him:—

"About two years ago, whilst experimenting with some banana juice, so as to find out how best to mordant it, a thick and pliable rubber was found to attach itself to the sides of the enamel dish which held the juice. The rubber was ultimately sent to England and to America, and it was found to be what is known as a synthetic rubber, and when compounded with other rubbers it appeared to have a distinct market value, by increasing both the weight and the value of the rubbers with which it was compounded. This fact is about to be put to the severest test, and numerous samples are to be sent to the best judges both in Europe and America."

Rubber Shares.

	November 18th	October 14th
Bukit Rajah	8 to $8\frac{1}{2}$ ..	$8\frac{3}{8}$ to $8\frac{5}{8}$
Cicely Estates Co. (Ord.) ..	25/6 to 26/- ..	—
Highlands and Lowlands ..	$2\frac{1}{8}$ to $2\frac{1}{4}$ ..	2 to $2\frac{1}{4}$
Klanang Produce Co. ..	$5\frac{7}{8}$ to $6\frac{1}{8}$ ..	$5\frac{7}{8}$ to $6\frac{1}{8}$
Lanadron Estates	$4\frac{1}{8}$ to $4\frac{3}{8}$ ..	4 to $4\frac{1}{2}$
Linggi Plantations (2/- paid)	23/3 to 23/9 ..	24/- to 24/6
Perak Rubber Co.	$3\frac{1}{8}$ to $3\frac{1}{4}$ ..	$3\frac{3}{8}$ to $3\frac{1}{2}$
Selangor Rubber Co. (2/- paid)	36/- to 37/- ..	34/3 to 35/3
Shelford Rubber Co. ..	30/- to 31/3 ..	32/6 to 35/-
United Serdang Rubber Co.	$3\frac{5}{16}$ to $3\frac{7}{16}$ ..	$3\frac{7}{16}$ to $3\frac{9}{16}$
Vallambrosa Rubber Co. ..	23/6 to 24/- ..	22/9 to 23/9

Prices quoted in previous issues should be compared with above.

As a proof of how TROPICAL LIFE gets about, we reprint the following extract from a letter recently received from Mr. George S. Hudson, the owner of the well-known Errard Estate, St. Lucia, W.I.: "Your notes about my Pentagona cacao (see TROPICAL LIFE for July, p. 111) comes home to me from every second planter I have met here and in Grenada. They have even written me from Trinidad about it." We do not consider the West Indies by any means as our best centre for subscribers. This being so, if we have so many readers out there, it shows how we must be patronized elsewhere.

Another letter to hand, speaking of our August issue, said: "The article on cacao statistics is the most comprehensive and the best article that I have yet seen on the subject."

Advertisers wishing to get into touch with cacao and other planters in the West Indies and elsewhere will note the above with satisfaction.

THE revenue of the Gold Coast Colony has increased from £90,450 in 1879, to £752,000 last year, and the total imports and exports from £751,800 to £4,554,000. The cacao industry of late must have helped greatly to bring about this most satisfactory state of affairs. With better transport facilities even this increase could be greatly advanced, for of cacao alone a substantial proportion is left on the trees for lack of porters to convey it to the coast.

Cotton.

THE following were the prices for Cotton in London on November 12th, according to Messrs. Slann and Davies :—

	Good Fair.	Good.	Fine.	Superfine.	Good 1909.	Good 1908. (Compare)	
	d. d.	d. d.	d. d.	d.	d. d.	d. d.	
Surat kinds * ...	$5\frac{3}{4}$ to $6\frac{1}{8}$	6 to $6\frac{7}{8}$	$6\frac{1}{4}$ to $7\frac{3}{16}$	—	$4\frac{3}{8}$ to $4\frac{3}{4}$	$4\frac{9}{16}$ to $5\frac{3}{8}$	per lb.
Madras	$6\frac{1}{2}$ to $6\frac{5}{8}$	6 to $6\frac{7}{8}$	—	—	$3\frac{7}{8}$ to $4\frac{11}{16}$	$4\frac{5}{8}$ to $5\frac{3}{8}$	—
Bengal	—	$5\frac{1}{2}$	$5\frac{3}{4}$	$5\frac{7}{8}$	$3\frac{1}{2}$	$3\frac{11}{16}$	—
Assam	—	$5\frac{7}{8}$	$7\frac{3}{4}$	9	$4\frac{3}{8}$	$5\frac{1}{4}$	—
China	—	$6\frac{1}{4}$	$6\frac{3}{4}$	$7\frac{1}{4}$	$4\frac{1}{2}$	$4\frac{7}{8}$	—
West Indian ...	7	$7\frac{1}{2}$	$8\frac{1}{2}$	9	$5\frac{1}{2}$	$7\frac{1}{2}$	—
Sea Island ...	9	$11\frac{1}{2}$	$16\frac{1}{2}$	$19\frac{1}{2}$	$8\frac{3}{4}$	12	—
Australia	$8\frac{1}{8}$	$8\frac{1}{2}$	—	—	$5\frac{7}{8}$	$7\frac{1}{4}$	—

* Liverpool quotations.

The American Ginners' fourth report, issued on Monday, November 8th, gave Cotton ginned to November 1st as 7,012,000 bales, against 8,190,000 last year, and 6,128,000 in 1907. We have had another week of manipulated markets, with violent fluctuations, but on balance, the change in values is not much, viz., 4 to 12 points lower for "future" deliveries. Spot Cotton in Liverpool is reduced 14 points, "middling" being now 7·77d. Manchester does not report very cheerfully about the trade in manufactures. Buyers do not care to follow the advance in Cotton, and business is very difficult indeed. East Indian descriptions have fluctuated in values, and close about unchanged, but there is very little business about.

The import into Liverpool this week amounts to 110,221 bales; since September 1st, 525,063, same week last year 134,224, last year's total 622,891 bales. The estimated Sales amount to 45,000 bales. Middling American is quoted at 7·77d. per lb.; last year, 4·99d.; 1907, 5·92d.

The latest quotations of Americans for delivery, basis middling, any port, G.O.C., were :—

	November 11th. d.	Last Week. d.	Last Year. d.
November	$7{\cdot}57\frac{1}{2}$	7·63	4·79
Nov.—Dec.	$7{\cdot}57\frac{1}{2}$	7·62	4·69
Dec.—Jan.	$7{\cdot}58\frac{1}{2}$	7·62	4·67

Movement of American Cotton since September 1st :—

	1909-10.	1908-9.	1907-8.
Brought into sight	4,297,000	4,204,000	3,025,000
Exports from United States since September 1st—			
To Great Britain	832,000	689,000	664,000
To Continent, &c.	1,341,000	1,354,000	826,000
Total crop	—	13,825,000	11,572,000

Coffee.

By Messrs. C. M. AND C. WOODHOUSE.

There is very little change to report in this market; the moderate supplies offered have been in fair request, and were mostly disposed of at fully steady rates. Full values were obtained for Nyasaland, and Colombian maintained last prices. Dumont Santos partly sold at unchanged rates. The market for "futures" opened weak on lower advices from the Continent, but became firmer on unfavourable reports of the crop, and the close (November 11th) is steady at 32s. per cwt. for March Santos, being an advance of $7\frac{1}{2}$d. per cwt. for the week. We quote :—

		1909. To-day.	Nov. 4th.
London ..	Santos, Mar. delivery.	32s. 0d.	31s. $4\frac{1}{2}$d.
New York ..	No. 7 Rio ,,	6·50 cents	6·45 cents.
Hamburg ..	Santos ,,	36 pf.	$35\frac{3}{4}$ pf.
Havre ..	Santos ,,	45 francs	$44\frac{1}{2}$ francs.

The receipts at Rio and Santos from July 1st to November 10th, 1909, were 10,648,000 bags, against 7,163,000 bags and 5,882,000 bags in the two previous seasons respectively.

Sales include the following :—

Nyasaland.—870 bags, at 43s. 6d. to 47s. 6d. for smalls, 44s. 6d. to 56s. 6d. for fine ordinary to good middling, 50s. to 62s. for low middling to good middling bold.

Jamaica.—5 barrels at 37s. for ordinary smalls.

Costa Rica.—100 bags, at 47s. to 56s. 6d. for ordinary to fine smalls, 45s. for good ordinary, 69s. for bold.

Mexican.—34 bags at 44s. for smalls, 66s. 6d. for good bold.

Peruvian.—34 bags at 45s. for fine ordinary pale greenish.

Colombian, &c.—2,000 bags, at 39s. 6d. to 52s. for smalls, 44s. to 59s. for fine ordinary to good middling, 50s. to 55s. for low middling to middling bold, 56s. to 67s. for good middling to fine bold.

Dumont Santos.—2,500 bags, washed at 40s. to 42s. for smalls, 45s. 6d. for medium, 49s. for bold; unwashed 40s. 6d. to 41s. for smalls, 42s. to 42s. 6d. for medium, 46s. 6d. to 47s. for bold.

MR. C. RAWSON in his Report to the Bihar Indigo Planters' Association, states that the soils there as a rule were found deficient in available phosphoric acids, and responded remuneratively to treatment with superphosphate, bone-meal, or other phosphatic manures. Nitrogenous manures were generally found useful when applied along with phosphates.

The India-rubber Market.

By Messrs. S. Figgis and Co.

A fresh record established. Smoked Malay Sheet at 9s. 8½d. on November 2nd.

On October 22nd fine hard was worth 8s. 9½d. for spot, but 8s. 3d. was the price for November delivery. Castilloa ball had sellers at 4s. 9d.

By October 29th the market had advanced rapidly to 9s. 1½d. spot for fine hard, whilst for November delivery the price had risen to 8s. 7½d. On the other hand, Castilloa was down to 4s. 6½d.

The first week in November saw the record price so far established for any kind of rubber, viz., 9s. 8½d. for fine smoked Malay sheets. November delivery for hard fine rose to 8s. 9d., and Castilloa ball was firm at 4s. 7½d.

At the auctions on November 2nd prices went as follows:—

Malay Plantation.—Sheets: fine smoked, 9s. 7¾d. to 9s. 8½d., one lot 9s. 4d.; fair to fine, 9s. 0¼d. to 9s. 1½d.; mixed, part pressed and rough, 7s. 7½d. to 8s. 10½d.; Block: fine pale Lanadron held for 9s. 6d.; Crêpe: good to fine pale, 8s. 11¾d. to 9s. 1d. (three cases very fine white, 9s. 2¼d.); fair to good palish, 8s. 9½d. to 8s. 11¼d.; light brown and grey, 8s. 4d. to 8s. 8d.; clean brown, part dark, 7s. 7d. to 8s. 3d.; dark brown, part specky, 6s. 8d. to 7s. 3¼d.; black and soft, 4s. 11d. to 6s. 4d. Scrap and Virgin pieces: fair to fine, 6s. 0½d. to 6s. 8¼d.

Rambong.—Good red Crêpe, 6s. 11½d. to 6s. 11¾d.; fair to good scrap, 4s. 3d. to 5s.

Ceylon.—Sheet and biscuits, fair to fine, 9s. 0½d. to 9s. 0¾d. Crêpe, fair to fine pale, 9s. to 9s. 1¾d. (sixteen cases very fine white, 9s. 3d. to 9s. 3½d.; thick pale Rosehaugh, 9s. 0½d. to 9s. 3d. per lb.); fair palish, 8s. 6¾d. to 8s. 11d.; clean brown, 7s. 10¼d. to 8s. 4¼d.; dark brown, 6s. 11½d. to 7s. 6d.; black and soft, 4s. 1d. to 6s. 6d. Scrap, fair to fine, 6s. 3¾d. to 6s. 8¼d.

Mollendo.—Unselected fine, 7s. 8d.

Mangabiera and Mattogrosso.—Santos sheets, fair, 3s. 8¾d.; rejections, 2s. 4½d.

Colombian and Central American.—Fine smoked scrap, 4s. 9½d.; good brown scrap, 4s. 4¾d.

Zanzibar and Mozambique.—Good Lamu ball, 4s. 2¼d. to 4s. 3d.; Lamu ball, softish white, 3s. 9d.; clean ball and sausage, 5s. 4d.

Abyssinian.—Fair sheet, 3s. 7¼d. to 3s. 10d.; lumps, 3s. 9d.

Uganda.—Biscuits, good, 7s. 1½d.; biscuits, thick and medium, 7s. 0¼d.; pears, part soft, 4s. 6¼d.

The sales on November 16th and 17th brought a sharp decline and sold at 8s. 3½d. for November and 8s. 0½d. for December delivery, showing 6d. drop in the fortnight. Of plantation kinds, 193 tons were offered, the large quantity causing the sales to run into the second day. Fine smoked Malay sheet realised 9s. 2¼d. to 9s. 4d., and fine pale block, 8s. 10¼d. to 9s.; fine pale Crêpe up to 8s. 9¼d.; fine pale Ceylon Crêpe sold up to 8s. 9¼d; sheet and biscuit to 8s. 8d.

Pará rubber statistics for the month of Oct. (tons):—

	Pará.	Caucho.	1909.		1908.	1907.	1906.
Receipts at Pará ..	2,950	320	= 3,270	agst	3,460	3,200	3,030
Shipments to Europe	1,310	250	= 1,560	,,	1,890	1,520	1,580
,, America	2,020	70	= 2,090	,,	1,480	1,300	1,390

Sugar.

Mr. C. Czarnikow, writing on November 11th, reports that the sugar market has altogether ruled firm since the 4th, New York reporting that the Louisiana crop after all will only be 325,000 tons, and it is thought here that full figures for Cuba and Porto Rico, which might enable Europe to buy in Cuba, are not assured either. Meantime, the meltings are again reduced to 25,000 tons, and sugar is scarce, quotations, after being easier, having gone up from 4.36 to 4.45 cents. But no Beet Sugar seems wanted at European prices of 4.55 cents, even if the Cuban crop with present rainy weather, which only yesterday showed some improvement, should not start very early. Quotations of May Beet in Europe improved from 12s. 1d. to 12s. 6¼d. to 12s. 6d., partly because consumers had to buy largely, which sales had to be covered in paper, and partly because crop reports are not very sanguine. It is supposed that Russia will not even be able to satisfy all the requirements of Finland, and that German sugars may be wanted there, whilst Italy may require Austrian. Altogether we shall have limited supplies, and we may again reduce final stocks; whether this is already discounted by prices of 12s. 8d. August, as against 10s. 8d. for October-December, remains to be seen.

Of October figures United Kingdom shows 13,000 tons less consumption, and 14,000 tons less imports of Cane, of which the balance was attracted to New York. Stocks in United Kingdom have decreased 26,000 instead of 13,000 tons, and with 60,000 tons British Refined consumed, the stocks thereof were reduced below 30,000 tons. The German exports are 75,000 against 60,000 tons, the French consumption 62,000 against 60,600 tons, Austrian production 414,000 against 498,000 tons, which only shows that the season began late. The Austrian exports are 78,000 against 82,000 tons, the consumption 50,000 against 51,000 tons, stocks 324,000 against 442,000 tons. More interest will attach to the German figures, because they give the quantity of roots and allow conclusions to be drawn as to yield, though in a late season, without second runnings, figures are misleading.

The Indian imports of September have been published; it appears that of Javas the April-September imports total 188,500 against 119,000 tons; all crops seem to be good in India, which means a prosperous season, during which the buying power is great; therefore imports should continue good for some time, and, in fact, a good business has been done already for quite a year ahead. Javas for summer delivery are therefore not pressing, though America may drop out as a buyer. In India the sugar crop in United Provinces (52·7 per cent. of total area) is estimated at 75 to 80 per cent. to 100 per cent. of normal yield, which is fully up to last year's.

The American market has been very firm, and the quotation for centrifugals has advanced to 4.45 cents = 12s. 9d. c.i.f. for 96 per cent. Javas = 11s. 9d. f.o.b. Hamburg for 88 per cent. nett beet. In the United Kingdom the demand for cane sugar has continued brisk, and quotations are about 3d. per cwt. dearer for refining sugars. Low sugars are still in very small supply. There have been no auctions of grocery crystallized, and privately only a small business has been done at fully steady to rather dearer rates.

There have been no auctions of British West India during the week, and privately only about 4,000 bags have changed hands at steady to rather dearer prices.

Tea.

By Messrs. Wm. Jas. and Hy. Thompson.

Natal and Nyasaland Teas, average 5¾d. per lb.

The improvement in tone noticed at the closing auctions last week, ending November 5th, has been maintained throughout the current sales, and while there has still been some irregularity in values, the losses and gains have been about evenly divided.

During the week 50,075 packages of Indian were brought forward, against 37,654 packages in 1908. Notwithstanding a continued full supply, the tone throughout the sales was firm, excepting perhaps for the lowest qualities, which were occasionally easier.

With the general decline in quality, which has of late been noticeable, a large proportion of the invoices offered have only been medium and good medium, Pekoes selling from 7½d. to 8½d. per lb. On this basis the trade generally, both at home and abroad, seem disposed to buy freely, feeling apparently that these kinds should prove a sound investment, and are therefore satisfied to stock perhaps beyond their immediate requirements. Common leaf sold freely at late rates, the quotation for fair Pekoe Souchong being 6⅜d. per lb. Good medium Brokens from 8d. upwards fully maintain their recent level of values, but leaf grades were not quite so freely bid for, although marking no change in rates. Fine and finest kinds were again well supported, all standout liquoring parcels selling very well. Flavoury Darjeelings were keenly competed for, the proportion of choice flavoured teas being small. One hundred packages of Natal tea and 241 packages from Nyasaland were offered and realized averages of 5¾d. per lb. respectively.

The average of the sale was 8¼d. per lb., last year 8d. per lb. At the sales held in Calcutta on Friday, November 5th, 34,000 packages were sold at an average price of 6 a. 6 p., last year 5 a. 9 p. There was a generally good demand, but prices ruled irregular. Darjeeling teas were rather dearer.

Importers of Ceylon were only able to bring forward 14,638 packages, against 23,133 packages last week, and 18,843 packages for the corresponding sale last year. As compared with last week the general tone of the market was slightly firmer, and bidding was brisk throughout, very little being withdrawn. Not infrequently, with a steadier market for low and medium teas, finest kinds are apt to suffer, and to some extent this has happened, a few of the better brokens failing to come quite up to valuations. Tea for price was strong at last week's rates, while low Pekoes and Brokens here and there showed a fractional advance. Dusts and Fannings were well supported. The highest averages recorded were: Cranley and Battalgalla, 10¾d.; Kotiyagalla, 10½d.; Kenmare, 10¼d.; Nutbourne, Kelliebedde, and Hauteville, 10d. For the entire sale the result was 8¼d. per lb., against 8½d. per lb. last year.

Firmness throughout has been noticeable with the China market, and a fair business has been transacted in grades of Black leaf from 8d. to 1s. per lb., which show a hardening tendency, supplies of these becoming scarce. Very few of the lower grades ex recent arrivals have been placed on the market. Green teas remain quiet.

Since January 1st 107,823 packages of Java have been catalogued, against 99,508 packages in 1908. Following the general market there was a good demand at about previous rates. Tippy Brokens were well competed for, and an occasional advance was paid. The best averages made were: Goalpara, 11¼d.; Djati Nangor and Merang, 8¾d.; and for the whole sale the result was 7¾d. per lb., against 7d. per lb. a year ago.

In Holland there was less demand than at the previous sale consequent upon quality being hardly equal, and with merchants unwilling to make concessions a large amount of tea was withdrawn. Prices were irregular with a downward tendency.

The London Cocoa Market.

By The Editor.

The market generally during the past four or five weeks has remained steady, and whilst landings (in London) have fallen away, deliveries have been sufficiently heavy to further reduce the stock another 14,000 bags, leaving it on November 13th, as stated further on, with 89,074 bags, against 103,340 bags on October 9th, and 70,838 bags in 1908.

The Board of Trade figures to the end of October show a further increase of 530 tons in our home consumption figures, and the same as in London, the total receipts for the whole of the United Kingdom exceed the deliveries, the increase being nearly 450 tons. This, at even 15 bags to the ton, means a decline in the total visible stock of the United Kingdom of 6,750 bags. The full figures issued by the Board of Trade, worked out as usual into tons, are as follows:—

Raw Cocoa only—	Import.	Del'd. H.C.	Exported.	Stock, Oct. 31st
Oct. only, 1909—	2,406	2,223	614	— tons
,, ,, 1908—	1,657	1,706	690	— ,,
Jan.-Oct. only, 1909—	29,098	20,048	5,357	8,792 ,,
,, ,, ,, 1908—	25,931	17,897	5,265	5,312 ,,
Increases	3,167	2,151	92	3,480 ,,

The main cause of the increase over October, 1908, in the landings and deliveries for export (Jan.-Oct.) must have been supplied by Liverpool, where the figures to the end of October run as follows. Readers will note the marked decrease in the deliveries for home consumption and the heavy increase in the water-bound goods:—

Liverpool Figures.	Landed.	Del'd. H.C.	Sent Coastwise	Exported	Stock, Oct. 31st.
Jan.-Oct., 1907—	112,710	50,993	15,538	55,445	944 bags
,, ,, 1908—	147,401	66,100	23,691	60,512	3,949 ,,
,, ,, 1909—	184,117	39,596	42,690	112,741	3,825 ,,

Meanwhile the comparative consumption of the six chief consuming centres, according to the latest figures obtainable, works out as follows:—

		1909.	1908.	1907.
Germany,	9 months	30,311	24,123	27,622 tons
U.K. (raw only)	,,	17,816	16,183	14,424 ,,
France	,,	16,930	14,296	15,854 ,,
Holland	,,	23,432	19,528	15,894 ,,
Belgium	,,	5,532	4,573	4,387 ,,
	Totals	94,021	78,703	78,181 ,,
Add U.S.A. (Imports less re-exports)	8 months	40,454	26,687	28,765 ,,
	Total	134,475	105,390	106,946 ,,

Stocks in London and Havre stand thus:—

London, Nov. 13th—	1909.	Value.	1908.	Value.
Trinidads	11,652	52/- to 58/6	13,207	57/- to 64/-
Grenadas'	11,436	50/- ,, 54/6	5,387	48/- ,, 57/-
Other W.I.	3,137	48/- ,, 54/-	3,436	48/- ,, 56/-
Ceylon and Java	19,815	—	10,717	—
Guayaquils	18,913	59/- ,, 68/-	18,869	56/- ,, 70/-
Brazil and Bahia	2,467	51/- ,, 54/-	1,288	52/- ,, 55/-
African	9,574	(West Coast)	9,767	(West Coast)
Other Foreign	12,080	45/- to 50/-	8,167	45/- ,, 50/-
Total	89,074		70,838	

Havre. Oct. 30th.	Stock. 1909.	Value. Fcs.	Stock. 1908.	Value. Fcs.
Pará ..	30,497 ..	66 to 70 ..	9,283 ..	76 to 80
Bahia ..	16,050 ..	62 ,, 66 ..	13,916 ..	60 ,, 65
Venezuela	45,976 ..	66 ,, 150 ..	30,255 ..	70 ,, 150
Trinidad ..	34,431 ..	68 ,, 70 ..	25,178 ..	72 ,, 77·50
Other W.I.	4,128 ..	60 ,, 69 ..	7,399 ..	62 ,, 72
San Thomé	7,268 ..	64 ,, 66 ..	1,473 ..	58 ,, 65
San Domingo	26,413 ..	57 ,, 60 ..	30,799 ..	56 ,, 59
Hayti ..	9,710 ..	51 ,, 63 ..	10,680 ..	50 ,, 64
Accra ..	8,839 ..	57 ,, 58 ..	6,045 ..	55 ,, 60
Guayaquil, &c.	30,059	G'l 65 ,, 78 ..	26,920	G'l 72 ,, 82
Total ..	213,371 bags.		161,948 bags.	

At the end of September the stock was 221,201 bags, so that Havre also has reduced her holdings by 8,000 bags. Above quotations at Havre show how irregularly prices have moved this year compared to the same time in 1908. This is very similar to what the above comparative prices show in London. In Havre, Pará, Venezuela, Trinidads, other West Indies, and Guayaquil prices are lower, whilst Bahia, San Thomé, San Domingo, Haiti, and Accra show, at least in the commoner qualities, rather higher prices. Whilst San Thomé is quoted at Havre fcs. 64 to 66, against fcs. 58 to 65, last year in London the nominal value is only quoted at 49s. to 51s. 6d., against 52s. to 54s. last year.

Owing to the Lord Mayor's Show, no sales were held on November 9th, but, judging by the private business done, prices rule as follows :—

Trinidads.—Fine good red marks, 57s. to 58s. 6d.; middling to good red marks, 54s. 6d. to 56s.

Grenadas.—Good to fine, 52s. to 54s., to occasionally 54s. 6d.; common unfermented to fair fermented, 50s. to 51s. On November 16th, fine touched 55s. 6d.

Dominicas.—Ordinary unfermented, 49s.; fair to good reddish, 50s. to 51s. 6d.

Jamaicas.—Good red up to 52s. 6d.; common unfermented, 46s. to 49s. for fair.

St. Lucia.—Fine sold up to 54s.; common unfermented sold down to 48s.

Demerara.—Good reddish sold at 54s. to 54s. 6d.

Cameroons still sell at 54s. for good-sized piles.

Surinam.—Fine sold at 58s.

Bahia continues to sell at 54s. for superior, and sellers show no disposition of going lower, if anything it is the other way.

Samoa.—Fine boldish sold at 67s.; good reddish, 59s. 6d.

Guayaquils.—Arriba continues to sell at 66s. to 68s.; Caraquez is selling as high as 57s. to 61s.; Manta sold at 58s. in October, but now realizes 61s. also; Tumaco and Esmeralda last sold at 50s. to 51s.

Stocks in New York on November 9th were 20,000 bags less, say :—

Sanchez	5,878 bags
Bahia	11,397 ,,
Venezuela	14,009 ,,
Arriba	14,413 ,,
Trinidad	5,569 ,,
Grenada	2,159 ,,
Others	18,601 ,,
Total	72,026 ,,

At the public Bark sales in Amsterdam, on November 4th, a drop of three points was recorded, the average being returned as 2·95 cents. against 2·98 in October. In London, on November 16th, the price remained practically unchanged at $\frac{9}{16}$d. per unit.

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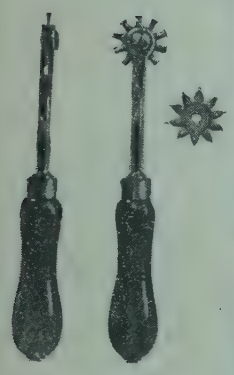

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"Tropical Life" Prize for the best Essay on The Fermentation and Drying of Cacao.

THE CUBAN GOVERNMENT SUBSCRIBES £5.

We have received the following letter from the Secretary of the Agricultural Department, Cuba :

"The writer realizing the great importance to the industries of this Island of the competition started by you in order to encourage closer study on the "Fermentation and Drying of Cacao," has heard with pleasure of the idea, and in consequence of this has had the article translated (into Spanish) and published in the *Boletin del Departamento*, in order to bring the matter before the planters, &c., on this side, so that they can join in this idea of TROPICAL LIFE, either by subscribing to the prize fund, or by sending in essays to compete for the prize.

"This department (Secretaria de Agricultura Commercio y Trabajo de la Rep. de Cuba) has heard of the project with much interest, and has the pleasure of subscribing £5 to the fund, and encloses cheque for that amount. At the same time it sends two copies of the *Boletin*, with the terms of the competition, &c., translated into Spanish.

"ORTELIO FOYO,
"Secretary of Agriculture, &c."

This support from so influential a quarter is most welcome, and will further stimulate our friends to take part in the competitions, either as subscribers to the prize fund, or as competitors for the prize. Two or three friends wrote at the start to say that they were considering the matter of subscribing to the funds. If they are able to bring these considerations to a conclusion and arrive at a favourable decision, we shall be able to offer a second prize of £25, *which we are most anxious to do.*

Meanwhile, for those who have not seen our previous issues, we would again state that we are offering a prize of £50 for the best essay on :—

The Fermentation and Drying of the Cacao or Cocoa Bean (*Theobroma cacao*).

The essay should record precisely and in full detail the changes resulting from the processes of fermentation and drying that take place in the bean from maturity in the pod to the time of putting the cured beans into bags for market. Biological as well as chemical changes should be noted. The action of maximum, minimum and optimum temperatures, and of checks producing differences of times in the fermentation and drying processes should be noted for every stage. The differences due to such variations on the resultant cured bean should be clearly traced. The possibility should be discussed of producing at will by such variations, and independently of the natural character of the bean, varieties of taste and of colour, both internal and external, so as to simulate the different kinds of cocoa known on the

market. Alterations that might be made in ordinary methods so as to improve the quality of the cocoa should be explained. Waste products should be considered, and their potential value indicated.

The experiments on which results are based should deal with the beans in marketable quantities, and samples should be submitted in illustration of statements made.

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(3) Every candidate or competitor agrees to accept as final and to abide by the award of the Editor of TROPICAL LIFE, whose decision in the matter must be taken as binding. No correspondence can be entered into respecting the awards.

(4) An English translation must accompany all essays not written in that language, so that the onus and risk as to correct translation will rest with the competitor.

(5) Essays must be written on one side of the paper only; when possible the essay should be typewritten. In any case the writing must be clear and distinct. Corrections causing doubt or difficulty to decipher must be avoided

(6) All essays must be sent to the Editor of TROPICAL LIFE, at his City Office, 112, Fenchurch Street, London, E.C., to reach him on or before January 31st, 1911. No essay arriving after that date will be eligible for competition. Every essay will be acknowledged on receipt.

(7) Every essay sent in must have attached to the head of the first page the competitor's full name and postal address. In submitting the essays to the Judges, the name, however, will not be made known until after the prize is awarded.

(8) After the prize has been awarded any balance left over will be devoted to publishing those essays which, in the opinion of the publishers, are considered of sufficient merit.

(9) Competitors must fill in and attach the above coupon to their essay.

Re Cacao Fermentation.

By Dr. AXEL PRYER.

(Translated by permission of *Der Tropenflanzer*, by Mr. Victor Hamel-Smith.)

PART III.

In order to obtain the nearest explanation of the nature of the fermentation of cacao, I undertook in Ceylon a microscopical examination of the fresh seeds as well as of the fermented mass, to which numerous practical tests were added. The complete report is as follows:—

The fresh cacao seed as it comes from the ripe fruit is a longish egg-shaped body varying in size, chiefly 2 cm. to 2·5 cm. long, and 1 cm. to 1·5 cm. thick; it is white, pale pink, or pale yellowish. With a cross cut one can distinguish two husks, which surround an inside hollow space, outside the pulp, inside the seed-shell. In the inside of the hollow space the little germ is found, surrounded by two large bud leaves (cotyledons) which are covered with a very thin skin over all their surface.

The pulp, which covers the seeds as well as the sides of the inner hollow space of the cacao fruit to a thickness of 0·5 mm. to 1 mm., usually consists of large cells of irregular shape, originally parenchymatic cells; between these, large intermediary cell spaces are found. The pulp cells swell very much in warm water. Small to larger agglomerations of a granular substance form the contents of the cells; these consist chiefly of gum, whilst the cell walls consist of cellulose. Besides this, sugar is found in the fresh pulp; on the other hand, albumen could not be found in distinguishable quantities. The colour of the pulp is pure white, only by fermentation does it become a reddish to brownish colour; the taste of the pulp is sweet and gumlike.

The shell of the fresh cacao seeds is of a leathery nature. It is firmly surrounded with the pulp, but free on the inner side, so that a removal of the leathery skin from the cotyledons can easily be effected. The leathery skin is 0·5 mm. to 0·6 mm. thick, and consists of three layers of different cells: (1) A single (and here and there a double) layer of thick-walled stony cells, which are packed closely together, and connected with the compressed cells of the pulp on the inside. (2) A thick middle layer of fibrous tissue which surrounds chlorophyll-bearing cells, and contains spindle-shape hollow spaces. (3) A single and occasionally double layer of parenchymatic cells which form from within the epidermis of the seed shells; the cells are mostly empty. The colour of the leathery skin is first pale brownish; but after the fermentation it becomes yellow, then red to dark brown.

The thin and shiny transparent skin which covers the whole surface of the cotyledons consists of a single layer of very regularly formed empty parenchymatic cells, which are not firmly grown together with the germ leaves, but can be drawn off.

Lastly, the cotyledons form together a longish egg-shaped body of smooth surface; inside they lie in numerous deep folds on each other, and round the germ; they are of soft nature, white, yellow, or violet coloured, and possess a strongly bitter taste. The cotyledons come from the parenchym tissues. In the cells are deposited reserve substances in the shape of thickly compressed globules, such as fat, starch and albumen.

If several samples are taken from a heap of the cacao beans on the second day from the commencement of the

fermentation, and the outer pulpish substance be examined under a strong microscope, countless organisms of various natures show themselves in and about the pulp cells. In Ceylon were found sprouting fungi of ellipsoidal or rounded spindle-shaped form, besides bacilli, which occurred singly or in pairs, and spores of various sizes on the cacao beans lying on the surface, also moulds (Aencillium among others). On the other hand, in Java were noticed several other kinds of wild yeasts, including pointed, spindle-shaped and cylindrical forms; also spores, bacilli, and spirals.

The question then arose whether the changes were produced during the fermentation by one of the living plasma of the generated enzyme of the cacao seeds, or by the assimilation of the existing bacteria, or by the vitality of the yeast cells. The production of the enzyme in the living cacao seeds can take place by germs; these, however, never appear in fermentation, the germ soon being killed, owing to the fermenting process, and therefore fermented seeds are not germ bearing (this Hart has already mentioned). On the other hand, it would be possible that the other plasma-containing cells generate the real enzyme. Against this, as well as against the second question, whether the bacteria are the inciters of the fermentation, there is the fact that neither in the total exclusion of living organisms in general, nor in the absence of yeast cells, do the known phenomena of fermentation take place; at the most with the presence of bacteria, formation of acidity or decomposition follows. Of course, in the case of fresh cacao beans which are exposed by the exclusion of air organisms, a darker brown colouring soon takes place, but that is all; further changes do not take place in the colour of the cotyledons or in the bitter taste; the pulp also is not so easily washed away as in well-fermented seeds.

The living yeast cells in the pulp are apparently the inciters of fermentation; according to Buchner, the chemical changes they produce with the help of the existing enzyme always deserve consideration when studying cacao fermentation. After several attempts at yeast cultivation in Ceylon, I was able to isolate one variety, and grow it separately. This one is always found in Ceylon plantations in the fermenting cacao, and in the fermentation trials gave by far the best results. It appears without doubt that other kinds of yeast, perhaps even European beer and wine yeasts, can create a fermentation of cacao. However, the best yeast will probably only be discovered by careful cultivation of those which at present seem to be most satisfactory. As a starting point the kind of yeast found in Ceylon seems to be very suitable. This is distinguished from all the Saccharomyces described hitherto, or at the most it slightly resembles *S. ellipsoideus* (I. Hansen), and *S. membranæfaciens*. I have described the new variety above.

The sprouting fungus of the cacao fermentation—(*Saccharomyces theobromæ* (Preyer)—is of longish, ellipsoidal shape, in the midst of almost cylindrical cells, which, though separate, lie together in short chains or in heaps. The length of a cell measures on the average ·00615 mm., the cross diameter ·0031 mm.; such cells are found in the middle of a pure bacilli culture in nourishing liquid. The cells of the sediment have a short, compact formation, and those of the mycoderm skin are of very long cylindrical form, generally with rounded ends, the latter variety being up to ·032 mm. long. The contents of the cells consist of plasma and vacuolen (empty cells), and these are, in most cases, easily discernible. In the long mycoderm skin cells three or four vacuolen (empty cells) are also to be found. With the withdrawal of nourishment, Asko spores form in eighteen to twenty hours (in 25° C.). The spores are very small, and fill the cells in large quantities. *S. theobromæ* are found in Ceylon in fermented cacoa. A pure bacilli culture can be made in a decoction of fermented cacao beans. In raw sugar, solution yeast is not found, and no fermentation takes place, but degenerate dwarf-shapes form, and finally die off. In the cacao decoction the fungus begins to form after one and a half to two days (at 25° C), at first a white, later a grey mycoderm skin, which becomes light red on its upper edge (on the walls of the test tubes). The yeast germinates in cacao pulp of alcoholic fermentation.

(*To be continued.*)

THE Katunayaka Branch of the Ceylon Agricultural Society has undertaken to cultivate cassava and paddy on a commercial scale with special fertilizers, generously provided by the chairman, Mr. Rajahakse Mudalujar. The report of the Dumbara (Ceylon) Agricultural Society on supplying paddy with artificials shows that the manured field yielded 122 bushels of paddy, whilst the unmanured one gave only 62 bushels. In straw also the gain was substantial, viz., 175 bundles more from the manured area than from the other. Both fields were 2 pelas in extent.

The Economic Value of a School of Tropical Medicine.

Want of space prevents us including our usual monthly article on the work that the London School of Tropical Medicine is carrying on in the Tropics, in order to make life possible where it was impossible before, and to make it more certain where hitherto it has not been safe for Europeans to remain. No one can deny that such work is of the utmost importance if valuable colonial centres are to be developed, and useful lives saved. The trade of this country needs extending; we are told that we are already the heaviest taxed nation on earth, whilst it seems doubtful if we are the wealthiest.[1] *We hear a great deal about the necessity of "broadening the basis of taxation," but far too little about broadening the basis for earning the money out of which the taxation is to be obtained. This, however, is what* TROPICAL LIFE *and the London School of Tropical Medicine mean to do. "Lest we forget," therefore, who it is that is working so strenuously, so pluckily, but also so unobtrusively to enable the enterprising trader to fill his pockets, and the Government their coffers, this notice will appear so long as the articles are to be published.*

"Subscriptions are badly needed to enable those connected with the London School of Tropical Medicine to push on with their work. Every resident and visitor in the tropical zone benefits through this most necessary institution, we therefore hope that every reader of TROPICAL LIFE *will send a subscription or donation to enable the work to be further extended. Cheques or money orders can be sent to P. Michelli, Esq., C.M.G., Secretary, London School of Tropical Medicine, 'Dreadnought' Hospital, Greenwich, London, S.E., or, if preferred, to the Editor of* TROPICAL LIFE. *Acknowledgment will be made in this column for all amounts sent, no matter how small, if the sender will mention the name of this paper in his letter covering the remittance."*

We are pleased to be able to report that the following contributions have been received by the School of Medicine:—

J. Anderson	...	...	...	**£20 0s.**
G. Mansfield	...	...	...	**£3 3s.**
F. Warrack	...	...	...	**£2 2s.**

We trust that this may stimulate others to send in their subscriptions and donations so as to enable us to bring the amount up to £50 by Christmas. Will you help us to do so?

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[1] According to Mr. Barker, in the *Fortnightly Review*, Great Britain is taxed Mks. 95·80 per head, France, 82·70, United States of America 80·80, and Germany (if correct) only Mks. 47·17. On the other hand, we are told that, there are only £210,000,000 in the United Kingdom Savings Banks, against £800,000,000 in the German Savings Banks, and the same in the American.

Reviews.

MOSQUITO OR MAN? OR, THE CONQUEST OF THE TROPICAL WORLD. By Sir Rubert Boyce, M.B., F.R.S., Dean of the Liverpool School of Tropical Medicine. Pp. 267, with many illustrations. Price 10s. 6d. net. (London: John Murray, Albemarle Street, W.)

As leaven to stir up and stimulate others to action Professor Sir Rubert Boyce's latest book cannot be too well known. It should be carefully read by every medical man, Government or municipal authority in charge of mosquito-stricken areas. Every word that Professor Boyce has committed to paper is undoubtedly correct, and his proposals to minimize the chances of epidemics are, we are willing to agree, quite right, so far as theory is concerned. When, however, it is a matter of putting them into practice, we feel that it would be difficult, if not impossible, to do so without making a heavier demand on the patience and pockets of the inhabitants—at any rate of the British West Indies—than 90 per cent. of the population would be able to meet for a sustained effort, even if, in the first flush of enthusiasm, they are willing to make the experiment. Professor Boyce is, we believe, over-sanguine with regard to the readiness with which the permanent residents of the Tropics will receive and carry out his proposals as explained in this book or in his lecture before the West India Committee.

The reforms advocated by Professor Boyce may not be less necessary, but they seem to us to be more interfering and drastic (as on p. 152) than were the water regulations which (coupled with the inability of the then heads of the Trinidad (West Indies) Government to understand the people under their charge) brought about the riot in Port of Spain. Enthusiasm is a good thing, but you can have too much even of a good thing, and having heard Sir Rubert Boyce lecture, and after reading his book, we fear that he is a scientific enthusiast rather than a practical expert, at least with regard to the West Indies. All the same, his book is a very useful one, and should be widely read by all interested in the Tropics and in mosquitoes.

BRAZIL IN 1909. By G. C. Oakenfull. Pp. 237, with many illustrations. (The Brazilian Propaganda Commission, Paris, 28, Boulevard des Italiens, and Plymouth.) Pocket size, printed on thin paper, except illustrations.

WE have referred to this work in our columns on more than one occasion, and often find it a handy book for reference. Our Editor this winter in his lectures on "Modern Brazil" found Mr. Oakenfull's book a reliable source to draw on for information in a condensed form. On comparing what he states under the various headings (Historical, Climate, Agriculture, Minerals, &c.) with the large and much more pretentious works reviewed in our November issue, we found that the data given is correct, explicit, and very full considering the space available. Anyone interested in, or trading with Brazil will be glad to come across such a book, and several of the chapters would make a good text-book for children, teaching them to read and at the same time giving them a good idea of Brazil's history and future possibilities as a commercial and producing centre. On these points no one can be too fully informed. To those about to proceed to Brazil we strongly recommend this most handy little work, which, although we carry it about in our jacket pocket, contains detailed information, under twenty different headings, of everything that concerns Brazil. We heartily congratulate the author on its production.

FERTILIZERS AND MANURES. By A. D. Hall, M.A., F.R.S., Director of the Rothamsted Experimental Station. Pp. 384, with nine illustrations, and index. Price 5s. net. (London: John Murray, Albemarle Street, W.)

DR. HALL, whose book on "The Soil" (which was an introduction to the scientific study of the growth of crops) has already run into a second and enlarged edition, now offers his readers, who must be as numerous as the sand on the sea-shore, the above book as a companion to it, and further promises them yet a third volume later on to deal with the chemistry of the growing plant.

The present book will fill an important place in any agriculturist's bookshelf, whether in England, the Colonies, or the Tropics. It is worthy of the closest study by the planting expert attached to a company, members of the Government agricultural staffs, or the ordinary planter, whether their crop is cereals, tea, cacao, rubber or sugar. As far as we can judge the information is reliable, and is certainly based on experiments carried out at a centre which, like Cæsar's wife, is above suspicion. The use of some form of fertilizer, Mr. Hall tells you in his preface, is becoming more and more a mark of modern agriculture . . . It was the discovery and introduction of artificial fertilizers and feeding-stuffs—nitrate of soda, guano, the phosphates, cotton-cake, &c.—which enabled the British farmer to raise his output per acre by at least 50 per cent., "and that even abroad the supply of rich virgin soil is not without a limit, nor are its riches inexhaustible." We would particularly commend the book to those of our Argentine readers who wish to maintain that manures are not wanted in the pampas lands, whereas we have always urged that Argentina should, with the enormous wheat, linseed, and other crops that she puts out annually, pay the closest attention to replenishing her soil, and not wait until it becomes noticeably exhausted. Mendoza certainly needs potash and other manures, as is shown by the reports of her fruit crops. The cost of production is rising the world over, and wages tend higher, even with the most backward races; this will, of course, compel the producer, *nolens volens*, to turn his attention to fertilizers and intensive culture to recoup him with larger crops for the extra cost per acre for their production. To all such, this book should be welcome, for it will help them to that greater skill and knowledge in the use of manures and fertilizers without which no modern planter, be he in the tropical or the temperate zones, can hope to succeed permanently.

The book has been printed for all to read—master, man, and boy—and deals rather with the use than the manufacture of the fertilizers. The language is non-technical, or as far so as possible, though, of course, some elementary knowledge of chemistry has to be assumed. The three essential ingredients of all manures under their respective headings and in the order of their agricultural importance are dealt with—"Nitrogen," "Phosphates," "Potash"; other chapters being devoted to "Farmyard Manure and Guano." Chapter XI. contains special notes on tropical and sub-tropical crops, whilst elsewhere the properties of basic slag are also fully dealt with, whilst the necessity of using it for damp, heavy, or sour wet soils (as on cacao lands in Jamaica or San Thomé) is described and carefully discussed.

A VERY USEFUL BOOK BY DR. WILLIS, OF CEYLON.

AGRICULTURE IN THE TROPICS: An Elementary Treatise for the Student and Traveller. By J. C. Willis, M.A., Sc.D., Director of the Royal Botanic Gardens, Ceylon, and Editor of *The Tropical Agriculturist*. Demy, 8vo, cloth, pp. xviii. + 222, with 25 plates, price 7s. 6d. net. (London: The Cambridge University Press, Fetter Lane, E.C., and H. K. Lewis, 136, Gower Street, W.C.; New York: G. P. Putnam's Sons; Bombay and Calcutta: Macmillan and Co., Ltd.)

THE book has been issued by the Cambridge University Press as one of the Cambridge Biological Series, under the general editorship of Mr. Arthur E. Shipley, M.A., F.R.S., Fellow of Christ's College, Cambridge. No attempt has been made, Dr. Willis tells you in his preface, to write a book for the practical planter, but rather as a pioneer and strictly elementary work to attract and fix the attention of the man at home on the advantages and possibilities that the tropics (vastly improved both as regards healthiness and means of transport) of to-day can offer to young men with capital and energy. Such a book, circulated through the excellent medium of the Cambridge University Press, should be the means of leading many to take up with tropical industries for a living, in which case the book will do yeoman service both to the individual and to the Empire at large. For the practical man the book also has much useful information, even if, like Dr. Willis, he has scoured the tropical planting world. Much useful information can be gathered from the chapters in Part I. devoted to transport, capital, tillage, manuring, plant life, and agriculture in the tropics. Part II. deals with the products and their diseases; Part III. with agriculture generally in the tropics, pointing out the varying methods under which it is carried on; whilst the last section, Part IV., touches more on the organization of tropical agriculture, and comments on the various departments of agriculture.

The following among many comments are not without interest. "Capital will not be invested in any country until there are satisfactory conditions as regards land, labour, and transport." "The Federated Malay States have to pay 60 per cent. more for labour than Ceylon; this may cause Ceylon to pay more in the future, as both centres tap the same source in Southern India for their supplies." "In general it may be said that every tropical cultivation needs manure." "Yields per acre for rice are said to be (p. 46) 700 lb. in Ceylon, probably 900 lb. in India, though the Tinnevelli district of Southern India exceeds, it is said, that of the Malay Peninsular, where as much as 2,000 lb. per acre are obtained." "Sorghum or Guinea corn (*Sorghum vulgare*) is grown on 8,000,000 acres in Bombay and 4,000,000 acres in Madras, as well as elsewhere. . . . Bulrush millet (*Pennisetum typhoideum*) covers 8,000,000 acres," making 20,000,000 acres at least under millet in India. "It is found in Java that shading coffee renders it less liable to leaf disease."

REPORTS from New York state that Japan proposes to open a tea campaign in the United States on the lines adopted by Ceylon for the purpose of pushing Formosa teas, and that Brazil is to take steps of the same sort in the interest of Yerba Maté tea.

The Cult of the Coco-nut.

(*Continued from p.* 164).

LEAF DISEASE.

WITH leaf-disease, it would appear that the leaf, after succumbing to the numerous drains upon its resources, falls to the ground before the mycelium has attained the utmost limit of its development; for if a leaf that has fallen on a dry spot be placed in a moist chamber, a multitude of pustules bearing conidia will be produced within forty-eight hours, while if a leaf that has fallen in a damp place, where it is shaded from the effects of the sun, be examined, large numbers of spores can be seen to be given off, thus showing that the mycelium is capable of further growth after the leaflet has fallen to the ground. The spread of the disease appears to be influenced by the age and condition of the plants, and, as with root disease, improved cultural methods are of the highest importance in checking it from spreading, if not in actually curing the disease.

Where the disease, short of the death of the tree,[1] causes the planter considerable loss, is by the serious check that it gives to flower development. On account of the disease, less flowers are produced, and finally the diseased condition of the trees becomes marked in the shortness of the crop of nuts. Even if the nuts are there, the restricted food supply checks their development, and reduces their size, and, of course, their marketable value, if they have any market value left.

Investigations show that the best way to avoid leaf disease is to surround the trees by conditions that promote vigour and health, so that if the disease has not already arrived, it can be kept away, and if the palms are attacked they are encouraged and enabled to overcome the trouble to a very great extent. The fungus seems to be weakly, parasitic and only capable of doing appreciable damage when the conditions are extremely favourable for its development.

Experiments show that infection can take place by the germination of the spores, the germinal tubes of which can pass through the stomata of the leaf, and through wounds of any kind on the leaf surface. No result, however, was obtained when the spores were placed on the upper surface of an uninjured leaf, which may indicate that these germinal tubes are incapable of penetrating through the epidermis of the leaf.

In Trinidad it had been noticed that the disease, at present, is doing serious damage only when the condition of the soil and cultivation are unfavourable to healthy plant growth, and, therefore, in order to keep the palms vigorous and healthy, the matter of drainage, allowing a sufficient water supply, of manuring and cultivation generally, cannot be too carefully attended to. With lands below the sea level, or containing surface water in excess, drains should be cut to carry the surplus water away, and so prevent its becoming "sour." Manuring coco-nut lands is of much more importance than most planters seem able or willing to realize. Manuring may not actually cure the disease, but if the right manure is used, and it is properly applied, it may be the means of strengthening the

[1] This is brought about by the mycelium from a large number of disease spots spreading throughout the whole of the interior of the leaf, and entirely destroying many of the leaves. When the whole of the leaf-area of the plant is destroyed, the terminal bud falls over, and the tree eventually dies.

growth of the plant, and the problem of manuring should be solved by the best resources at the command of the estates. We certainly mean to solve it to the best of the ability of ourselves, coupled, we hope, with a little help from Mr. Stockdale and other friends.

The best remedy for leaf disease seems to be fire, and great care must be taken not to drag diseased portions over the ground, as by doing so, there is great danger of spreading the disease. All dead trees should be cut down, and the pieces collected carefully together and burnt. All diseased leaves, on otherwise healthy-looking trees, should be cut out and burned, and any leaves showing signs of disease should be completely destroyed by fire, with as little transportation about the estate as possible. Trees found with diseased leaves must, after their removal, be carefully attended to. Manure should be given to them, and the soil around them properly tilled, in order to enable them to throw off the attacks of the fungus. If the disease continues to spread, spraying with fungicides would render the spores of the fungus incapable of germination, and so tend to check the trouble. Bordeaux mixture would probably be the most economical fungicide, and should be applied by means of a spray pump and a long hose attached. All trees showing any signs of disease should be sprayed at frequent intervals to prevent germination of the spores.

(*To be continued.*)

Ceara Rubber in Hawaii.

THE Annual Report of the Hawaii Agricultural Experiment Station for 1908 has just come to hand, prepared under the direction of Mr. E. V. Wilcox, special agent in charge, in succession to Mr. Jared G. Smith. The report carries many illustrations, and includes useful information on rubber, cotton, bee-keeping, fruits, &c. Mangoes freceive special attention, and the full accounts given of fertilizing and manuring ricefields are worthy of the closest study. Speaking of Ceará rubber, Mr. Wilcox reports as follows on the methods adopted for planting and tapping :—

"During the last quarter of 1907 experiments were made in planting Hevea[1] rubber seeds. They germinated and grew best when the shell had been removed and the seeds planted in clean sand. The herring-bone system of tapping on Ceará rubber trees gave quite favourable results.[2] In some experiments on Kauai it was at times found difficult to coagulate the latex. This was accomplished, however, by the addition of hydrogen peroxide and sulphuric acid. As many as thirty consecutive tappings were made by excising a thin slice of bark from the old wound, and a good flow of latex was obtained during the whole period. The use of a water bag, or an ammonia bag, was found to increase the relative amount of first-grade rubber as compared with scrap rubber. By tapping yearling trees it was found that the yield differed greatly. This point may be of value in indicating which trees should be cut out and which ones should be kept in the plantation to increase the total yield."

This is the first time that we have heard of any trouble being experienced to coagulate the latex; the trouble has always been to keep the latex from coagulating.

[1] We query whether this should not have been Ceará.

[2] So it did in Nyasaland on the estates of the African Lakes Corporation.

Our Campaign against Insect Pests.

OUR thanks are due to the Dayton Spray Company for the support and help that they have offered us, unhampered by any conditions, to carry on our campaign against insect and fungus pests in the Tropics. It is now nearly five years since we started in this journal to wage war on these plagues to cacao, cotton, rubber, and other estates. Before this we had for ten years and more been working to this end in other journals. Of late we have had several offers from English makers to advertise their machines, but could not accept their orders, as by doing so we should have forfeited our independence, and been unable to recommend the machine that seemed in our opinion most suitable for the particular work to be done. These offers were made on two conditions :—(1) That all enquiries were sent only to the firm advertising with us; (2) that no other advertisement for spraying machines was to be accepted whilst the one firm was advertising. Whilst thanking these firms for their orders, we have had to refuse them, at considerable pecuniary loss to ourselves, because, as we pointed out, such offers practically amounted to our pushing a single machine, irrespective of its merits, simply because we were paid £20 or £30 a year to do so. Our reputation for impartiality prevented us from agreeing to this, as we felt that in the end such a condition would be satisfactory to no one—neither the buyer, the seller, nor ourselves. If, perchance, through no fault probably of the machine, the buyer is not perfectly satisfied, he would always mistrust us in the future, because we as the advertising medium had recommended the machine to him simply because we were paid to do so.

The Dayton Supply Company apparently have such faith in their machines that they feel certain of orders resulting sooner or later, if only full particulars of them can be brought prominently before planters, Government agricultural experts, directors of the various botanic and experimental stations, directors of the various planting companies, &c.[1]

This we shall do, thanks to the excellent circulation that we have in such quarters, and had the makers supported us as freely in the past as we hope they will do in the future, their sales would already have increased in proportion to the help and assistance that they gave us to help them push the sales. We say this, for we are by no means merely passive advertisers, but push the sale of our friends' wares in every way possible. To do this we make use of our twenty-six years' training in the tropical and colonial shipping trade, not only on this side, but also in the West Indies, Latin America, and India. During this period we have ordered and shipped, bought and sold all classes of estate machinery and supplies, including rice and wheat machinery for India, sugar and cacao machinery for the West Indies, and cotton gins and agricultural implements to most parts of the tropical producing world. It is on account of this practical knowledge and impartial judgment when advising our friends what to buy, that our advertisements have increased so steadily since we started five years ago, and why we feel certain that they will continue to increase to an even greater extent in the near future.

[1] We have published a pamphlet on the above subject for distribution by the various makers of spraying machines, price 80s. for 3,000 copies, including the printing of the firm's own advertising matter on the back cover.

Agricultural Appliances in India.

THE DEMAND EXCEEDS THE SUPPLY.

THE most interesting chapter in the Administration Report of the Director of Agriculture of the United Provinces of Agra and Oudh, India, according to our contemporary, the *Madras Weekly Mail*, is that entitled "Assistance to the Public," and some of its details may be considered in succession. The increasing demand for labour-saving appliances is traced to rising wages and increasing public confidence in the advice of the Department. Such appliances are chiefly desired by the landholders and larger cultivators, and as far as can be gathered the demand will increase still more rapidly in the next few years, so much so as to be beyond the power of the Department to cope with. The chief water-lift is a hand-power chain-pump for lower lifts on canals and lakes. About 250 of these were supplied during the year, and it was found impossible to meet the demand which arose rather suddenly in October. In view of this, the help of the Irrigation Department has been called in, and a number are being laid in stock for sending out on loan. There are also increasing enquiries for lifts of increased power, and some interest has been shown in oil-engines. But as regards the latter, the public are not yet familiar with their working, and next year the Department proposes to erect them for demonstration at selected places over the country. Of improved ploughs 363 were issued by the Department during the year. These were chiefly of the simpler Meston type, but nearly 100 Watts ploughs were included. A landowner at Philibit is making his own ploughs of the former type, with certain improvements, and finds them economical and satisfactory. There was a largely increased demand for maize.hullers and chaff-cutters, and sales were effected of kibblers and winnowers, while enquiries have been made concerning threshing and reaping machines. Seven village centres have been opened for the demonstration and sale of implements, and this has entailed an expansion of the departmental workshops at Cawnpore. The greater demand of the year has been temporarily met by the introduction of an oil-engine for working the tools, but even with the freest aid from local firms, it is seen that shortly the Agricultural Department will be unable to deal with the matter and private enterprise will have to be called in.

In face of so encouraging a report, no doubt a large number of our readers will be glad to exhibit at the Agricultural and Industrial Exhibition to be held at Allahabad (see TROPICAL LIFE for November, p. 185), where, as far as possible, the machinery will be shown working in close proximity to the produce requiring their help.

CO-OPERATION IN ENGLAND.

THE Co-operative Wholesale Society, Limited, of England, whose headquarters are at Manchester, started business on March 14th, 1864. In 1907, or forty-three years after starting, the Society's sales amounted to £24,786,568, their capital £5,407,120, and the bank turnover £119,503,152. They employ 17,000 hands, and are formed of an affiliation of 1,139 Distributive and Agricultural Co-operative Societies. They claim to be bankers, manufacturers, printers, cabinet-makers, shipowners, butter-factors, lard-refiners, bacon-curers, tea-growers, blenders, and packers, millers, and fruit-growers. They only need to become cacao, sugar, cocoanut, and rubber-planters to complete the circle of the world.

More Trouble in San Thomé.

THE CACAO TREES WANT MORE AIR AND MANURE.

OUR old friend, Mr. Almada Negreiros, the well-known Portuguese publicist, who resides in Paris, wrote some time ago asking our advice as to what remedies we could recommend to exterminate the disease, "Pourriture brune," which is troubling the cacao trees in San Thomé. We also see by the *African Mail* that the proprietors and representatives of the island have held a meeting to discuss the matter, as the disease is assuming alarming proportions and quite threatens the prosperity of the colony. According to the *African Mail*, the evil has in fact caused great damage on some of the plantations. It is worst in the dampest places, and, although the trouble has existed for some years, it seems to have assumed serious proportions only since 1906. Mr. Negreiros called it "Pourriture brune," and our contemporary reports that the French also call it "Pourriture noire." The ill, they say, seems to be cryptogamic, but on examination of the pods attacked, there was found an opening, made by insects, which contained worms. The pods become dark grey, nearly black, and, being unable to grow, they rot and die. In our reply we urged:—

(1) That an expert be sent out to report on the disease itself and to supply what immediate remedies it was found possible to give.

(2) That the trees be thinned either by pruning or cutting down, or other means. In any case, that much more light and air be allowed around the trunks and the ground, the damp places referred to above needing special attention.

(3) That basic slag, which has done good work in Jamaica to remove acidity in the soil from dampness, be applied. The lime that it contains has a beneficial effect on the soil, and the other constituents help to nourish the trees.

(4) That the trees then be supplied with phosphatic and nitrogenous manures in order to make them more vigorous and healthy, and so able, not only to withstand the disease, but to continue to put forth the very heavy crops that are annually taken from them in San Thomé without the equivalent being replaced in the soil.

Both kainit and muriate of potash should prove useful in such a case. The former has valuable insecticide and fungicide properties, and the latter acts very beneficially not only on cacao but on most Tropical crops. The lack either of potash or nitrogen in the soil would easily explain the low vitality and diseased condition of cacao trees in San Thomé or anywhere else.

From our knowledge of San Thomé cacao-lands, the soil has plenty of iron, but is very poor in lime and phosphoric acid. Owing to this, our friends are about to carry out a series of experiments on the estates with superphosphates in conjunction with nitrates in order to see what effect it will have on the trees. It is believed that some such treatment will be most beneficial in its results, and help to counteract the disease.

IN 1907 the exports of cacao from Ecuador amounted to 19,704,000 kilos (398,500 qtls.) but were valued at £1,842,000, whilst last year 32,119,000 kilos shipped (or 631,250 qtls., which created an easy record) were only valued at £2,088,000, or only 10 per cent. higher for 75 per cent. more cacao.

"Tropical Life" Friend.—No. 54.

Mr. A. L. DE ALMADA NEGREIROS.

The Leading Authority on Portuguese Colonial Affairs.

WE made the acquaintance of Mr. Negreiros, the same as of many of our other friends, at the Congress of International Tropical Agricultural Experts at Paris, which we attended in 1905, and on several occasions have made use of Mr. Negreiros' experience in tropical matters when questions have arisen on Portuguese Africa and other centres. To the many books that "Our Friend" has published on the Colonies he has quite recently added: "L'Instruction dans les Colonies Portugaises," which has attracted general attention from the learned societies on the Continent, and even from King Manuel himself, who congratulated the author on the work. Of his other books the best known are: "L'Isle de San Thomé" (about which Mr. Negreiros' knowledge is inexhaustive); "Colonne Commemorative de Diõgo Cão," "L'Epopée Portugaise," "L'Angola," "La main-d'œuvre en Afrique," "Le Mozambique," "L'Organization judiciaire aux Colonies," "Les Colonies Portugaises," "L'Agriculture aux Colonies," &c., all published by Aug. Challamel, 17, Rue Jacob, Paris. Besides these he has contributed many articles to the Press.

"Our Friend" has had a busy and important career. Even those who are unable to agree with him on colonial political matters realize what a hard worker he is and how skilfully he defends his side against their opponents. When *Sous-prefet* his Government instructed him to proceed to Paris to represent their colonial interests unofficially, and he has remained there ever since as an unofficial commercial attaché and mouthpiece for Portugal in the European and American Press when the colonial policy of his country is attacked.

At the Exposition Universelle held in Paris in 1900, Mr. Negreiros was nominated as delegate from Portugal and was elected a member of the jury. In 1906 he was elected Director of the Portuguese Section of the Portuguese International Colonial Exhibition that was also held in the French capital. In the Galerie d'Orléans of the Palais Royal is an excellent collection of Portuguese colonial produce which Mr. Negreiros has caused to be brought together there, and as founder of the museum he has taken the closest interest in keeping it up to date, and it has proved most useful to commercial and agricultural men trading with, or about to proceed to, the Portuguese Colonies.

Mr. Negreiros had a long training on the other side, as for twelve years he filled various influential posts, and advanced trade and agriculture in many ways. His scientific research work, carried on in connection with his official duties, caused "Our Friend" to be elected a member of the Royal Academy of Science, Lisbon, over twenty years ago, his work in connection with African ethnography being specially commended.

Mr. Negreiros is also a member of the Institut de Coimbre, of the Royal Geographical Society of London, of the Société de Geographie de Paris, of the Union Coloniale Française, de l'Institut Colonial International, of the French Colonial Press Syndicate, &c., and represents several important journals in Paris. It is generally acknowledged, and with reason, that Senhor de Almada Negreiros is one of the most useful men to Portugal on colonial and journalistic matters out of Lisbon; whilst there are very few, if any, men outside of Portugal who take an interest in colonial politics that are not well acquainted with his name.

Modern Brazil.

THE London *Standard* of December 9th, when commenting on the lectures that our Editor is delivering in London stated that "The Editor of TROPICAL LIFE delivered a lecture on 'Modern Brazil,' at Limehouse Public Library, last night. This is the second of a series that this gentleman is delivering in order to try to drive home to the public that, unless increased efforts are made to push the trade of this country by sending out the right type of young men to become planters or merchants, or to work under planters or merchants, our exports cannot increase in the same proportion as those of our competitors, whose sons are to be met with in all parts of the tropics, and especially throughout the trade centres of Latin America.

"At the conclusion of the lecture some fifty or sixty lantern slides were thrown on to the screen, showing the style of buildings to be met with in Brazil, and illustrating the coffee, rubber, cocoa estates, &c. The lecturer described the processes through which each of the articles went previous to shipment. His descriptions of tapping rubber trees, of curing the cocoa beans, and picking and hulling the coffee seemed to be much appreciated by the large audience present."

A NEW sprayer has recently been introduced into India for treating the supari or betel-nut trees, when attacked with a fungus called *koleroga*, which is stated to be quite distinct from the *koleroga* of coffee. The sprayer referred to holds about one gallon of fluid, which is expelled by means of compressed air. The complete apparatus costs about Rs. 20, and it is reckoned to cost Rs. 4 to spray an acre of palms.

Business Notices.

1.—The address of TROPICAL LIFE is Messrs. BALE, SONS AND DANIELSSON, Ltd., 83-91, Great Titchfield Street, London, W.

2.—All **literary communications** should be addressed **to the Editor,** and accompanied by the necessary stamps for their return if not accepted.

3.—All **business communications and payments**, either for subscriptions or advertisements, should be sent **to the Publishers** of TROPICAL LIFE. Cheques to be crossed The Union Bank of London, Ltd.

4.—The Subscription, which is **Ten Shillings** per annum, may commence at any time, and is payable in advance.

5.—The Advertisement Department is at 112, Fenchurch Street, E.C., where all enquiries respecting advertisements, charges, &c., should be addressed to the Manager of the Department.

6.—Changes of address should be promptly notified.

7.—Non-receipt of copies of the Journal should be notified to the Publishers.

8.—The Journal will be issued on or about the twentieth of the month.

The Managing Director and Editor of "Tropical Life" will be pleased to consider the printing and publishing of useful technical works on Tropical Agriculture, Medicine, or other subjects dealing with the development of our Colonies and the Tropics generally.

Tropical Life.

DECEMBER, 1909.

Cacao Culture in German Samoa.

Robert Louis Stevenson's Interest in the Industry.

PREVIOUS to the hoisting of the German flag in Western Samoa some small areas of cacao had been set out, but the commercial production of the bean had not so far been worthy of record. During the last year of his life, Stevenson was greatly interested in this culture, and occasionally for exercise, or possibly for mere change, he would join his native boys and weed away until his weak frame told him he had gone far enough. As was expected at the time, his ideas of cacao culture were radically wrong, and the considerable area which he had set out came to no good end, very few of the plants surviving to this day. This experience came also to others who sought, against all precedent, to accomplish results nowhere else attainable.

It has now transpired that though Samoa unquestionably produces cacao of the very highest value, and that it occasionally yields crops almost unbelievable in profusion, it still takes quite as long in that country to bring a plantation into the paying stage as it does elsewhere; and all of the old calculations that cacao would pay expenses in the fourth year and yield an enormous profit in the fifth year and thereafter are hopelessly wrong in practice. Instances of success have been known, but general practice proves that a plantation which is paying its expenses in the fifth year, and which netts from its crop from $100 to $125 per acre thereafter, is a good average plantation.

Usually, besides the length of time necessary for these results, it has cost the proprietor about $200 per acre to carry his plantation along to the paying stage. This money has gone out in the shape of wages to employés, food for them, houses, horses, wagons, and tools. Cacao properties, when in bearing, are difficult to buy, as owners, being sure of a fine revenue running for many years and with light expense, are unwilling to part with them. Probably $500 or $600 per acre would be a fair price for such properties, but so far no plantations in good working order have been disposed of; for although sellers are scarce enough, buyers do not appear in force either.

When a land selection has been made, the planter usually contracts with either Rotumah natives, Samoans, or Nieueans, to fell the bush and lop the branches of the fallen trees. The timber is allowed to remain prostrate for about six weeks, when the planter lines up his Chinese or other labour, and with light axes and heavy knives they cut off the branches and pile them about the stumps and heavy stems for burning. The usual practice is to cut and pile all day, and after 5 p.m. several labourers with torches set fire to the many piles which have been made, and these burn throughout the night much better than they would do during the heat of the day. Besides, when the labourers set to work on the following morning the smoke has disappeared and the field is clear for working. When the whole field has thus been burnt over once, the labourers are lined up again in the original positions, and the half-burned faggots are collected and placed about the stumps of those trees which exhibit signs of sending out shoots. Some varieties are very persistent, and a third and often a fourth burning is needed to kill them. Though the land thus roughly cleared is covered with the stems of forest giants, and great stumps stand up in all directions, the planter looks upon his clearing work as being nearly over. He now lays off the tract for his cacao, staking off the plant positions 12 ft. × 12 ft. or 15 ft. × 15 ft., as he decides upon, and holes are dug about 15 in. in diameter and 2 ft. deep, the extracted earth being placed on one side to sweeten for a time. Meanwhile, the whole field has grown green with millions of mummy apples and other spontaneous growths of vine or weed. Within a month after the last burning the property has to be weeded, part of the thick-growing mummy apples being allowed to survive to act as shade for the young cacao. Plants about 8 in. high are now brought from the nurseries and set out, and it is often that the shades of cocoanut branches or other materials are needed to protect them from the fierce rays of the sun, which are hottest during the intervals of the rainy season.

Within four months the mummy apples have grown to the height of 6 ft. or 7 ft., and they act as a good temporary shade, helping also to keep down weeds, which of all things cause the greatest amount of labour. A permanent shade, known as the dadap, is generally planted and spaced about 70 ft. apart. These trees grow much faster than the cacao, and serve to protect it from both sun and wind. The first pruning takes place in the second year, and harmful suckers must be kept down at all times. The young plants are hardy, and in three years are generally 5 ft. or 6 ft. high, often producing fruit and always producing blossoms. They are not at this time subject to any serious diseases, though occasionally one will die from attacks of fungus or white ants.

In the fifth year the plant endeavours to bear a heavy crop, and under usual seasonable conditions it succeeds in so doing; but the trees have not really reached their maturity until they are seven or eight years old, when their stems are about 10 in. in diameter, and the trees from 15 ft. to 20 ft. high. At this time, they shade the ground beneath them to such an extent that neither weeds or grass will grow. No further attention is re-

quired beyond keeping down the suckers which occasionally appear, and harvesting the crop.

Cacao in Samoa has no determinable season, and it is in fruit most of the year round, and owners of plantations often produce beans during every month. Crops up to 1,800 lb. of cured cacao beans are sometimes gathered from good acres during the year, but the average yield seems to be about 750 lb., worth locally at this time (May, 1908) about 17 cents per lb., or, say, $125 per acre. Of this fully $100 are profit.

Cacao in Samoa has a number of enemies which have to be fought, but experience seems to minimize those disadvantages which at one time were thought to be highly destructive. In fact it was feared that canker might destroy the industry. But a proper treatment has been found, and canker has quite disappeared from plantations once badly infected. This fungus seldom attacks trees which are less than five years old, and formerly it was usually fatal. With the present cure it may be eliminated at once; a second or third application is always successful if the parasite is discovered in time and the weather is not too wet; otherwise the canker is difficult to attack successfully. White ants entering the plant from the roots never manifest their presence until the trees are practically killed; fortunately their attacks are comparatively rare, not more than a quarter of 1 per cent. (·25) of the planted trees ever being infected. At one time rats and mice were exceedingly destructive, as they eat into the ripening pods in order to get the succulent fibrous connections between the seeds, and thus spill the seeds on the ground.[1] Time has shown that where plantations are kept in good order, and supplied with cats and fox terriers, and poison used occasionally, the rat plague keeps well within bounds. At the present time the rat plague seems to have been all but eliminated, and the cacao industry is in a very healthy state.

Last year's production only amounted to 116 tons, but as many new acres are now in bearing it is expected that during 1908 fully 250 tons will be exported, while in 1909 and 1910 very large sections will come into full bearing, so that the output, it is hoped, will run up to within the neighbourhood of 1,000 tons.

The planting of cacao continues unabated, and many rubber planters are setting out cacao trees between the rows of rubber, hoping to get a double crop in this way.

Good cacao lands are obtainable at prices ranging from $3 to $50 or more per acre, the price being chiefly regulated by the position of the area offered for sale. Generally the quality of the land is pretty well the same.

Chinese coolies brought into Samoa and working under governmental supervision perform most of the work. They cost the planter on an average about $10 per month, which includes cost of introduction, keep, medicines, hospital, and return after three years. As a good many Chinese elect to remain in Samoa after their term of service is over, it is evident they are well satisfied with existing conditions.

School facilities are fair for the lower grades, no attempt as yet being made to pass students beyond the common grammar school education. Taxes are moderate, and the general treatment of foreigners by the official classes is unexceptional.

[1] In Jamaica, our old friend Mr. Cradwick has discovered, whilst spraying cocoa trees against fungoid troubles with Bordeaux mixture, that rats would not go on these trees. How long the effect of such a spraying—which, if it thus serves several purposes, would be invaluable—will serve against rats has still to be found.

Cacao Cultivation.—No. XVIII.

By H. C. HENRICKSEN.

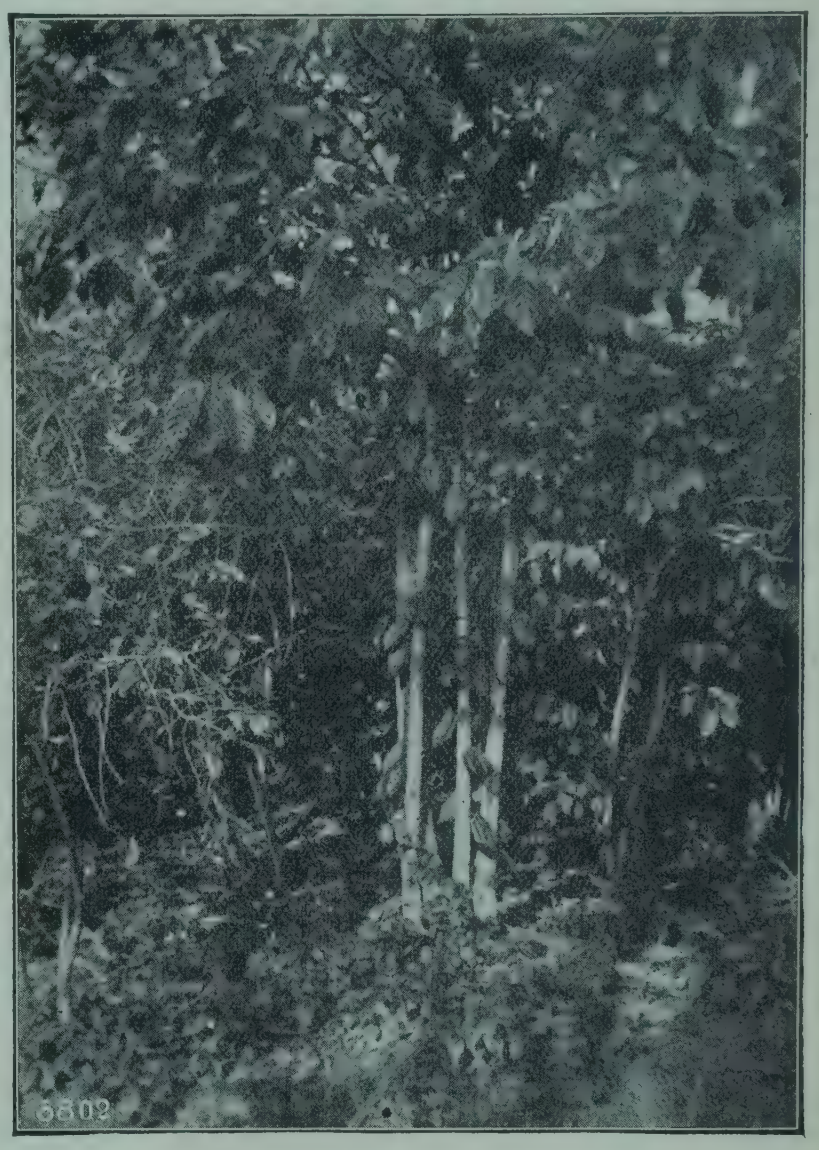
CACAO IN THE WEST INDIES.

CACAO has for years been one of the staple products of the West Indies, and all the islands together produce about 28 per cent. of the world's supply.

Table A, on the opposite page, shows the production in kilos during the last five years.[1]

SOIL AND CLIMATE

Cacao is planted in all kinds of soil in the West Indies, from heavy clay to light sand, and under all kinds of conditions, from steep hillsides to well-sheltered valleys.



CACAO SHADING COFFEE, GUADELOUPE.

While cacao will grow in different types of soil and under different climatic conditions, the commercial success of a plantation depends largely upon these two factors, although the knowledge of the man in charge is of no less importance. Some of the best plantations are located in valleys well sheltered from winds with a deep, well-drained land of loam soil containing an abundance of humus. The location seems to be more important than the soil, because the soil defect may be rectified, while it requires years to change climatic conditions if, indeed, they can be changed at all.

In the West Indies cacao thrives best in the lower altitudes, from sea-level up to 500 to 600 ft., and the moist, well-sheltered valleys with a rainfall of about 100 in. seems to be ideal, when properly drained.

[1] *Der Tropenpflanzer*, No. 10, 1909.

Varieties.

In most islands cacao is just cacao, the only distinction made is between yellow and red podded varieties. There are a number of distinct varieties, however, as shown by Mr. J. H. Hart in Trinidad, and it is well recognized that some of the varieties are much preferable to others. Unfortunately it has not yet been determined what special varieties are suited for special soils or climate, but there are usually a few trees in a locality or in an island that are vigorous and prolific and produce beans of superior quality. The seeds from such trees should naturally be selected for planting, or better still, their wood should be selected for budwood and budding on to the inferior quality trees.

The Plantation.

The majority of old plantations in the West Indies were evidently planted without regard to varieties and in many cases without regard to symmetry. In some the trees are very old, over a hundred years, and still bearing good crops, while in others the trees may be less than ten to twenty years old, and are apparently fit for firewood only. In all cases this is undoubtedly due to a number of causes, but in certain instances it is quite evident that there has been one predominating factor causing this premature deterioration.

Shade.

One of the questions on which there are divergent opinions, is shade. Whether shade will be needed or not, will depend entirely upon the soil and the location. A plantation located on level land and with a friable loam soil can be cultivated and kept in good tilth, so that shade will not be necessary to the same extent as on a hillside with a stiff clay soil that cannot be worked. As to location, it is especially desirable that the plantation shall not be subject to strong winds, as the cacao tree thrives in an even, moist atmosphere. It may therefore be necessary to provide shade in locations subject to dry winds. Such protection is not so much for the exclusion of the sun's rays, therefore need not necessarily be placed immediately over the trees, but if planted at intervals along the edge of the cacao plantations, where the wind is felt, it may be quite sufficient. It is well to remember that in the Tropics nearly all cultivated plants are benefited by protection from sudden changes in temperature and humidity of the air, which holds good for the soil also. Naturally such protection should be artificially provided wherever the natural conditions are not favourable.

Cacao is usually planted 12 ft. by 12 ft. (300 trees per acre) to 15 ft. by 15 ft. (about 200 trees per acre). In either case, the ground will be exposed to wind and sun for several years before the trees become large enough to afford shade, and with the greater distance apart, especially, such exposure may cause great damage. A soil suddenly cleared of forest growth and exposed to the elements, will soon loose its humus and available plant-food unless it is cultivated and planted with small crops such as beans, corn, &c. What takes place on cleared, exposed land is, that in a few years the trees will suffer because of the poor physical condition of the soil and the lack of plant-food. These are things of immediate interest to the planter. When his trees become weak and subject to the various diseases, the scientist may tell him what to do, but it has been learned by experience, both in the laboratory and in the field, that it is vastly cheaper to maintain the health of the tree, by immediately aiding Nature and providing conditions favourable to its growth from the start, than to cure it later on of any disease caused by neglect in that respect.

Table A.

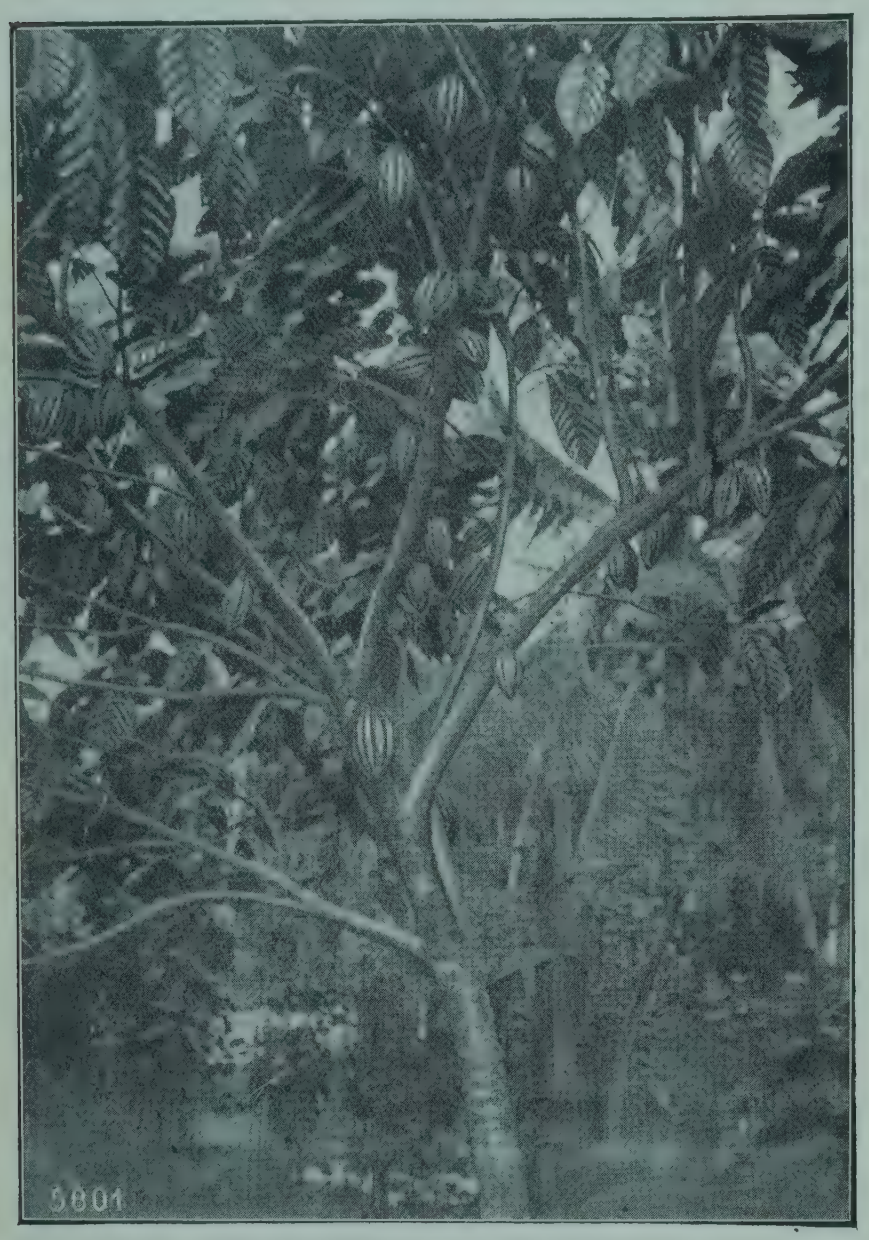
Island	1904	1905	1906	1907	1908
Trinidad	21,878,260	22,017,770	12,983,467	18,611,430	21,737,070
San Domingo	13,557,739	12,604,418	14,312,992	10,151,374	19,005,071
Grenada	6,009,755	5,796,575	4,931,530	4,612,100	5,108,245
Haiti	2,531,363	2,343,200	2,107,905	2,350,000	3,150,000
Jamaica	1,650,000	1,357,630	2,505,608	2,218,741	2,694,381
French Islands	1,215,000	1,179,401	1,262,090	1,387,219	1,500,000
Cuba	2,697,025	1,767,666	3,271,969	1,713,830	862,631
St. Lucia	800,000	700,000	716,200	750,000	700,000
Dominica	493,311	589,378	572,948	590,633	498,821
Total (kilos)	50,832,453	48,356,038	42,664,709	42,385,327	55,256,219

Table B.

Plot No.	Manure per acre per year	Yield of Cured Cacao per Acre					Average for five years	Cost of manuring per acre	Value of increase per acre over unmanured plots at 6d. per lb. of cured cacao	Gain per acre by manuring
		1902-03	1903-04	1904-05	1905-06	1906-07				
		lb.	lb.	lb.	lb.	lb.	lb.	s. d.	s. d.	s. d.
1	No manure	1,138	822	1,009	1,122	1,095	1,037			
2	Basic slag, 400 lb.; sulphate of potash, 150 lb.	1,540	1,170	1,179	1,105	1,285	1,256	45 3	109 6	64 3
3	Dried blood, 400 lb.	1,491	1,132	1,132	1,231	1,134	1,224	36 0	93 6	57 6
4	Basic slag, 400 lb.; sulphate of potash, 150 lb.; dried blood, 400 lb.	1,599	1,069	1,418	1,506	1,461	1,411	81 3	187 0	105 9
5	Mulched with grass and leaves	1,300	1,092	1,338	1,724	1,743	1,439	60 0	201 9	141 9

CULTIVATION AND FERTILIZATION.

In examining figures relating to the yield of cacao trees in the various islands we find that the average yield in Trinidad[1] is under rather than over 1½ to 2 lb. per tree, whilst in Grenada it is as high as 2 to 3 lb. and over. In St. Lucia about 1 lb. per tree is obtained without much attention, and 2 to 3 lb. when the trees are cultivated and fertilized. In Cuba[2] the average is 4·9 lb. per tree, and in San Domingo[3] 3 to 5 lb. per tree. This discrepancy is not due to the more favourable climate in Cuba and San Domingo nor to better care. On the contrary, the climate of the British Islands is more favourable, if anything; and although the planters



CACAO TREE IN BEARING, TRINIDAD.

there, until lately, have not paid much attention to cultivation and fertilization, the plantations are in most places better cared for than in Cuba and Santo Domingo. The reason undoubtedly is that, in the latter Islands, cacao is not grown extensively enough to cause the planters to be obliged to use old worn-out land, while in the British Islands the estates are often located, not only on somewhat exhausted lands, but also in situations not naturally suitable for the cacao tree.

It has been the watchword for the last few years to increase the yield and raise the quality of all crops, and many of the ablest men in the various agricultural departments are now engaged in cacao investigations in the laboratory as well as in the field. Field experiments, especially manuring tests, have been conducted for a number of years, and while the results are not uniform, the general conclusion reached is that manuring is necessary in order to increase the yield. This is quite in accord with Herbert Wright,[1] who says: "But few soils in the Tropics which have been under cacao cultivation for a few years are so rich as to be able to produce the best crops without artificial aid, and it is generally accepted that the supplying of plant-food is conducive to better and more rapid development of the plants and is, in most cases, essential."

Manurial experiments have been conducted for years in Dominica by Hon. Dr. Francis Watts, formerly Superintendent of Agriculture for the Leeward Islands, and now Imperial Commissioner of Agriculture for the West Indies. Speaking of an experiment at Picard,[2] he says: "Each of the constituents of manure [phosphate, potash, and nitrogen (as ammonia)] has increased the number of pods in a marked degree, and this has been the case whether the constituents have been used singly or grouped in various ways."

An experiment conducted by Mr. Joseph Jones at the Botanical Station, Dominica, and reported on by Hon. Dr. Francis Watts, may be worth recording, as it was carried on for a number of years on five plots of ¼ acre each (see Table B., p. 201).

From this, it will be seen that the soil was deficient in available plant-food, and that manuring was a paying investment, especially on plot No. 4, where the three plant-food elements—potash, phosphoric acid, and nitrogen—were used together. Plot No. 5 is a striking example of the influence of mulching, which is manifold. Mulch supplies plant-food, it improves the physical condition of the soil, and converts the insoluble mineral plant-foods into forms in which they are available to the plants. It conserves the moisture, keeps down the weeds, and maintains conditions in the soil that are favourable to the growth of cultivated trees.

The difficulty with mulch, as with stable manure, is that it cannot be obtained in sufficient quantities in the West Indies, and counting the actual cost of mulch, when it has to be brought in from outside fields or woods, it is usually as high as commercial fertilizers. There is no question, however, that the use of mulch, together with commercial fertilizers, is one of the best means of increasing the yield of cacao.

Whether to use mulch or not, will naturally depend on local conditions, and the kind of fertilizer to be used, as well as the amount that it will pay to apply, will also vary according to soil and climatic conditions. This is well illustrated by the results obtained in the various islands. For instance, Dr. Watts found in Dominica that an application of phosphate and potash did not pay without nitrogen, while Mr. Anstead found in Grenada that although phosphate without nitrogen exerted no benefit, potash without nitrogen did.

The whole thing in a nutshell is that, whenever every intelligent planter awakes to the possibility of the benefit that may be gained from independent study and experimenting, the various agricultural questions will be more than half solved. The old saying, "Help yourself and

[1] *West Indian Bulletin*, vol. viii., No. 4.
[2] Cuba Census of 1907.
[3] Unofficial.

[1] "Cocoa: Its Botany, Cultivation, Chemistry, and Diseases," by Herbert Wright.
[2] *West Indian Bulletin*, vol. ix., No. 2.

God will help you," might be supplemented with: Help yourself and the Department of Agriculture will help you. Then, and not until then, will the practical planter reap the full benefit of scientific work; and not until then will the experiment stations be of that great utility to the country at large which they are capable of becoming when properly appreciated and utilized.

Coffee.

By Messrs. C. M. and C. Woodhouse.

There is no alteration to report in this market during the past week (ending December 4th). Sales have been small, and previous prices were fully maintained for Colombian and Central American descriptions. Dumont Santos was firm. "Futures" have been steady, and, after a fair business, March Santos closed at 32s. 1½d. per cwt. We quote:—

		1909. To-day.	Nov. 25th.
London ..	Santos, Mar. delivery.	32s. 1½d.	31s. 9d.
New York ..	No. 7 Rio ,,	6·50 cents	6·40 cents.
Hamburg ..	Santos ,,	36¼ pf.	36 pf.
Havre ..	Santos ,,	45½ francs	44¾ francs.

The receipts at Rio and Santos from July 1st to December 1st, 1909, were 11,950,000 bags, against 8,311,000 bags and 6,664,000 bags in the two previous seasons respectively.

Sales include the following, viz.:—

Nyasaland.—126 bags, at 42s. for smalls, 52s. for middling, 57s. for bold.

Vera Paz.—5 bags, at 54s. 6d. middling.

Mexican.—350 bags, at 44s. 6d. for smalls, 52s. 6d. to 53s. for good middling, 62s. to 63s. for good middling bold.

La Guayra.—100 bags, at 51s. to 52s. 6d. for middling to good middling greyish.

Colombian, &c.—770 bags, at 44s. 6d. to 53s. for smalls, 40s. to 47s. 6d. for ordinary to fine ordinary, 50s. to 58s. 6d. for middling to good middling, 56s. to 63s. for good middling bold.

Dumont Santos.—2,700 bags, washed, at 41s. for smalls, 44s. to 44s. 6d. for medium, 49s. to 49s. 6d. for bold; unwashed at 39s. to 40s. for smalls, 41s. to 41s. 6d. for medium, 43s. 6d. to 46s. for bold.

The Imperial Department of Agriculture for the West Indies has issued Bulletin, vol. x., No. 2 (price 6d.), containing articles on "Central Sugar Factories," "The Underground System of the Sugar-cane," "The Cotton Industry in the West Indies," "Observations on Molasses," "The Scarabee of the Sweet Potato," and "The Treatment of Orchard Soils in the West Indies."

Cotton.

The following were the prices for Cotton in London on December 2nd, according to Messrs. Slann and Davies:—

	Good Fair.	Good.	Fine.	Superfine.	Compare Good 1908.	Good 1907.	
	d.	d.	d.	d.	d.	d.	
Surat kinds*	5 13/16 to 6 3/32	6 1/16 to 6 15/16	6 5/16 to 7¼	—	4 5/16 to 4 11/16	4 11/16 to 5 7/16	per lb.
Madras	5⅞ to 6 11/16	6⅛ to 6 15/16	—	—	3⅞ to 4 11/16	4½ to 5⅜	—
Bengal	—	5 9/16	5 13/16	5 15/16	3½	3¾	—
Assam	—	5⅞	7¾	9	4⅜	5¼	—
China	—	6⅜	6¾	7¼	4⅜	4⅞	—
West Indian ...	6¾	7¼	8¼	9	5½	8	—
Sea Island[1] ...	10	12½	17½	20½	8¾	12½	—
Australia	8⅛	8½	—	—	5⅞	7 5/8	—

* Liverpool quotations.

American receipts have fallen off materially, which probably accounts in a great measure for some renewed support this week (ending December 4th), which has raised prices of "Futures" 13 to 19 points. Spot Cotton has been in better demand in Liverpool, and "Middling" is now quoted 19 points up at 7·78d. Manchester advices are very gloomy, and trade there is evidently unsatisfactory. East Indian is dull at a slight decline.

The import into Liverpool this week amounts to 229,384 bales; since September 1st, 1,191,633; same week last year 88,446; last year's total 972,913 bales. The estimated Sales amount to 39,000 bales. Middling American is quoted at 7·78d. per lb.; last year, 5·02d.; 1907, 6·35d.

The latest quotations of Americans for delivery, basis middling, any port, G.O.C., were:—

	December 4th. d.	Last Week. d.	Last Year. d.
December	7·56	—	4·76½
Dec.—Jan.	7·55½	7·37½	4·75
Jan.—Feb.	7·59	7·40	4·75

Movement of American Cotton since September 1st:—

	1909-10.	1908-9.	1907-8.
Brought into sight	5,594,000	6,046,000	4,354,000
Exports from United States since September 1st—			
To Great Britain	1,114,000	1,087,000	1,033,000
To Continent, &c.	1,708,000	1,857,000	1,322,000
Total crop	—	13,825,000	11,572,000

[1] The following shows, at a glance, the variations in the price of fine Cotton since the beginning of the year—[Ed. *T.L.*]:—

Sea Island, 1909	Jan. d.	Feb. d.	March d.	April d.	May d.	June d.	July d.	Aug. d.	Sept. d.	Oct. d.	Nov. d.	Dec. d.
Good per lb. ..	8½	8	8	8⅛	9	9¼	9¼	9¾	9¾	10½	11½	12½
Fine ,, ..	12½	12	12	13	13	13½	13½	14	14	15	16½	17½
Superfine ,, ..	14½	14	14	15	15	16	16	17	17	17½	19½	20½

The India-rubber Market.

By Messrs. S. FIGGIS AND Co.

THE close of last month found the rubber market quiet, with fine hard at 8s. 2d. for spot, and 7s. 11¾d. per lb. for December delivery. Caucho ball up to 4s. 3d.

At the sales on November 30th, find hard sold at 7s. 9d. for spot, and Castillo (Caucho) ball at 4s. 2d. to 4s. 3d. per lb. Plantation kinds, however, went badly from 5d. to 1s. lower, say:—

Plantation Malay.—Sheet, fine smoked, 8s. 8d. to 8s. 10½d.; mixed, 8s. 3d.; fair to fine, 7s. 8d. to 8s. 1¾d.; mixed, part immature, 6s. 6d. to 7s. 6d. Crêpe, fair to fine pale, 7s. 8d. to 8s. 4d.; fair to good palish, 7s. 4d. to 7s. 7d.; light brown and grey, 6s. 8d. to 7s. 3d.; clean brown, part dark, 5s. 10d. to 6s. 7d.; dark brown, part specky, 5s. to 5s. 9d.; black and soft, 3s. 10d. to 4s. 11d. Scrap and Virgin pieces, fair to fine, 5s. 8½d to 6s. 0½d.; mixed and inferior, 3s. 6d. to 4s. 3d.

Rambong.—Fine clean red Crêpe, 6s. 4¾d; darker, 4s. 9d.; fair scrap, 4s. 1½d.

Ceylon.—Biscuit, dull, mixed, weak, 7s. 3¾d. to 8s. 1¾d. Crêpe, fair to fine pale, 7s. 8d. to 8s. 3d.; fair palish, 7s. 3d. to 7s. 7d.; clean brown, 6s. 3d. to 7s. 3d.; dark brown, 5s. 3d. to 6s. 1½d.; black and soft, 4s. 9d. Scrap, fair to fine, 5s. 6d. to 6s. 0¾d.

Mollendo.—Fine, 7s. to 7s. 0¼d; Entrefine, 6s. 10d.; scrappy, 3s. 6d.

Colombian and Central American.—Mexican Castilloa, soft weak Crêpe, 3s. 0½d.; clean dry scrap, 4s.; brown, part soft and wet, 3s. 3d. to 3s. 6½d.; Carthagena slab, 2s. 10d.

Mozambique and Zanzibar.—Lamu, fair to weak ball, 3s. 7d. to 3s. 11¾d.; unripe rooty, 1s. 6d. to 2s. 0¼d.

Madagascar.—Clean washed niggers, 3s. 4d.; good livery, 3s.

Mangabiera.—Pernambuco, sheet, 2s. 6d.

By December 14th the market had become easier, and a fair business was done in fine hard down to 7s. 3½d. for December delivery, whilst soft very dull sold at about 6s. 8d. to 6s. 9d. per lb.

Thin white pressed Mexican crêpe realised 4s. per lb.

At the sales on December 13th and 14th about 152 tons of plantation rubber were offered, and mostly sold at a decline of about 6d. to 8d. per lb. for biscuits and sheets, 6d. to 8d. for pale and palish crêpe, and 6d. per lb. for scrap. Brown and dark crêpes were very irregular, and in some cases even an advance was realized. Prices included block, 7s. 4d. to 7s. 4¼d. per lb. Crêpe, pale, 7s. 0¼d. to 7s. 1½d.; palish, 7s. to 7s. 1½d., biscuits and sheets, 7s. to 7s. 1d., "Warriapolla," 7s. 2½d. per lb.

Pará rubber statistics for the month of Nov. (tons):—

	Pará.	Caucho.	1909.		1908.	1907.	1906.
Receipts at Pará ..	4,250	390	= 4,640	agst	3,430	3,200	3,480
Shipments to Europe	1,550	240	= 1,790	,,	1,560	1,980	1,430
,, America	1,560	110	= 1,670	,,	1,920	1,550	1,650

Crop statistics, June 30th to November 30th, 1909:—

		Pará.	Caucho.	1909.	1908.	1907.	1906.
Pará Receipts	1909	11,650	1,550	13,200	12,450	11,680	12,110
	1908	11,060	1,390				
,, Shipts., Europe		5,020	1,220	6,240	6,250	6,610	5,540
,, ,, America		5,600	300	5,900	6,130	4,650	5,850

ACCORDING to Messrs. J. Russell Grant and Co., the market on December 2nd for Malay and Ceylon Rubber Company shares had been rather erratic during the week, after a fairly firm opening; on the rubber sales going weaker, shares came on offer, and a fair amount of business has been passing.

Sugar.

MR. C. CZARNIKOW, writing on December 2nd, reported that the market, during the early part of the week under review, was, under the influence of the expected revised factory estimates, with small fluctuations; when the figures, however, were published on Monday they were interpreted as a confirmation of the serious deficiency in the beet crops. Fresh speculative orders came in, and notwithstanding a good many realizations, prices improved to 12s. 8½d. for December and 13s. for May, closing to-day at 12s. 10½d.

The firmness was assisted by purchases on the part of refiners, who bought from 12s. 7½d. to 12s. 8¼d. f.o.b. basis 88 per cent. all that was obtainable at the price, also seconds at 11s. 1½d. to 11s. 3d. f.o.b. basis 75 per cent.

The present situation justifies full prices, but we are already at importing parity from New York (instead of having to fear American competition), and we are at 13s. 1½d. August—September, when the United Kingdom will melt in cane sugar nearly half her requirements, waiting for cheap new beet in October at 11s. We might therefore pause for statistical developments during some months, but when a few large operators are able to hold up a limited article, speculation will continually forestall natural developments, and the want of "bears" is never felt as long as holders remain confident and can force consumers to follow the rise, as at present.

The American market has been firm, and for Cuban sugars for January shipment $2\frac{13}{16}$ cents c. & f. basis 96 per cent. has been paid, and $2\frac{27}{32}$ cents is now asked; the spot quotation, however, has been reduced to 4.33 cents = 12 1½d. c.i.f. for 96 per cent. Javas = 11s. 1½d. f.o.b. Hamburg for 88 per cent. nett beet.

In the United Kingdom the demand for cane sugar has been satisfactory, and prices are again rather in sellers' favour, especially for low brown sorts. Grocery crystallized has been in only moderate supply, and steady prices have been realized for the small lots offered.

As to cane-producing countries, Cuba reports well respecting the growing crop, and one central started grinding yesterday. The West India mail advises satisfactory weather in Trinidad, but in Barbados rain was wanted. As regards Formosa, the figure given in our last week's circular of the direct consumption in Japan should have been 65,000 tons, leaving about 30,000 tons available for refiners' use. The Japanese Government has agreed (subject to confirmation by the Diet) to subsidize Formosan centrifugals for refining to the extent of 15,000 tons, and efforts are being made to get this quantity increased to 30,000 tons. Mail advices from the Philippine Islands report partial damage by locusts and drought; some estates in the Island of Negros anticipate only half a crop.

Of *British West India*, crystallized Demerara, dry pale realized 17s. 3d. duty paid, good palish to fine ditto 17s. 6d. to 17s. 9d., fine yellow 18s. to 18s. 1½d. Crystallized Trinidad, middling yellow 16s. 6d.

In *Liverpool.*—2,520 bags Peruvian Syrups sold at 11s. 1½d. to 11s. 6d. quay.

THOSE of our readers who are anxious to make their photographic friends a useful present for Christmas, should secure a copy of the "Wellcome Photographic Exposure Record and Diary for 1910." Price 1s., or 1s. 3d. post free, from Burroughs Wellcome and Co.

Tea.

By Messrs. WM. JAS. AND HY. THOMPSON.

WITH total sales amounting for the week ending December 4th, to 72,200 packages, compared with 70,775 packages the previous week, it is satisfactory to be able to report a steady market for all growths, and free buying on the part of the Home Trade and Exporters, with the result that quotations may be registered as firm, and in many instances marking an advance, with the exception perhaps of thin liquoring Assam Brokens, which have been in rather full supply, and still show a little irregularity. The moderate quantity of Ceylon tea offered has been barely sufficient for the Trade's requirements and with the prospect of no possible over supply before Christmas a firm to advancing market resulted. There has lately been some enquiry privately for forward delivery, but Buyers and Sellers have only occasionally come to terms.

There was a firm demand for all kinds of Indian. Fine grades sold well, and with a smaller quantity of stand-out tea on offer, prices frequently appreciated. Medium growths were strongly supported throughout, except for some of the more ordinary liquoring Brokens, which show a little irregularity. For Assam leaf teas bidding was again very keen at late quotations with an occasional advance for the most useful parcels. Common leaf is quoted at 6¼d.—6½d. per lb., a point better than last week, these grades keeping firm throughout the Sales. There was a good enquiry for Darjeeling teas with flavour, and for the limited quantity of this description high rates were paid. The reported improvement in quality of some of the teas from Dooars is borne out in one or two invoices sold recently, which met with correspondingly better rates. Travancore teas were also enquired for, satisfactory prices being given for tippy Brokens from this district. Shipping orders have been fairly plentiful during the week.

The following highest averages are of interest:—Darjeeling: Okayti Company, 1s. 6¾d.; Poobong, 1s. 0¼d.; Tukvar, 1s. 0¼d.; Thurbo, 1s.; Rungmook, 11¾d. Assam: Naganijan, 1s.; Digultarung, 11½d.; Towkok, 11d.; Beesakopi, Limbuguri, Sealkotee, Tara, 10¾d. Cachar and Sylhet: Jetinga, Deanston R, Mazdehee, Mookhamcherra, Rungamuttee, 7¾d. Dooars: Ghatia, Indong, Chuapara, 7¾d.

The average of tea sold on Garden Account for the week is 8⅜d. per week., against for 8⅛d. per lb. last year.

Of Ceylons low-priced tea was in strong demand, and a very small proportion of the sale was sold under 7d. per lb. Medium and fine to finest kinds also sold well, or frequently ¼d. to ½d. per lb. advance on last prices. Dusts and fannings were well supported. The highest averages obtained were: Goatfell, 1s. 0¾d.; Sutton and Cranley, 11d.; Kenmare, 10¾d.; Talawakelle, Glendevon, Palangie, Tillicoultry and Mooloya, 10½d.; Udaradella and Waltrim, 10½d. Kaipoogalla, St. Andrew's, Eltofts, Hauteville, Portmore and Taurus, 10d. The result for the whole Sale being 8½d. per lb., against 8⅜d. per lb. a year ago.

A firm tone prevails for China. Further sales are reported on Monings from 4¼d. to 5d. per lb., and from 8d. to 10d. per lb., showing full rates. Arrivals meanwhile have been on a very limited scale.

There was good enquiry for Javas, and a firm market on the basis of last week's rates, Tippy Brokens being in most demand, with here and there an advance in price.

The London Cocoa Market.

By THE EDITOR.

IT is with the greatest regret that we have just heard of the death, on December 13th, of Sir Alfred Jones, K.C.M.G., who has done more than most of us, perhaps more than any of us, to advance the commercial and agricultural undertakings of this country in the Tropics. The leading part he took in founding the Liverpool School of Tropical Medicine and the British Cotton-Growers' Association would alone cause his loss to be an Imperial one.

The case that was fought out at the beginning of the month between Messrs. Cadbury Bros., the well-known cocoa manufacturers, as plaintiffs, and the *Standard* Newspapers, Ltd., defendants, has done far more to call public attention to the San Thomé labour question than all the meetings yet held, or reports and books published on the subject. The action arose in respect to certain charges published in the *Standard* newspaper as far back as September 28th, 1908. As the papers contained from two to five columns each day on the trial, anybody and everybody who could read ascertained exactly the circumstances under which San Thomé cocoa is produced. There was no dispute about these, as both sides ruthlessly brought them prominently forward to the uttermost detail. We were told of one leading actor in the original agitation who had such a strong objection to the class of labour employed that he refused to have cocoa of any description in his house at all, thereby causing our own producing centres to suffer as well as San Thomé and elsewhere.

The whole matter confirms what we have all along maintained, viz., that our West Indian and other colonies, in order to compete against the San Thomé cocoa, must find some method of regulating the fermentation of their beans, so that all the proprietors, large and small, can turn out their produce "to type" as San Thomé does. The action should stimulate interest in our offer of a prize for the best essay on experimental work to bring about so desirable a state of affairs as our own Colonies being able to compete with San Thomé on this side.

Before starting on market news and present prices I will give the latest figures available as regards production and consumption. With regard to the former the following figures point out which centres can show an increase and which have so far shipped less (Bahia and San Domingo). The increased exports from the other centres far exceed any short shipments. Some consumption figures:

		1909.	1908.	1907.	
British West Africa, Jan.-Sept.		11,545	5,900	3,900	tons
Venezuela	,, Oct.	10,727	8,123	9,080	,,
San Domingo	,, ,,	14,346	17,869	9,500	,,
Pará	,, ,,	4,633	3,192	3,356	,,
Grenada	,, ,,	57,287	48,849	40,559	bags
Trinidad	,, Nov.	225,527	201,171	178,883	,,
San Thomé	,, ,,	417,100	379,979	327,093	,,
Bahia	,, ,,	422,657	435,066	296,800	,,
Guayaquil	,, ,,	593,400	576,500	369,500	qtls.

With consumption we will first take the Board of Trade figures for the United Kingdom to the end of November, and then give a table of the chief centres up to the latest dates available. With the United Kingdom we show a larger increase in the deliveries for home consumption during November than I ever remember noticing in any one month. During this month (November) 2,405 tons of raw cocoa were delivered, against 1,251 tons last year, and 1,835 tons in 1907. The eleven months work out as follows:—

Raw Cocoa only—	Import.	Del'd. H.C.	Exported.	Stock, Nov. 30th.
Jan.-Nov., 1909—	31,339	22,453	6,038	7,933 tons
,, ,, 1908—	27,373	19,148	5,859	4,905 ,,
Increases	3,966	3,305	179	3,028 ,,

Deliveries for consumption—		1909.	1908.	1907.
Germany	10 months	33,446	27,614	29,986 tons
Holland	10 ,,	25,898	21,327	18,096 ,,
France..	10 ,,	18,611	16,173	18,884 ,,
Belgium	9 ,,	5,532	4,573	4,387 ,,
U.S.A.	9 ,,	43,049	29,556	30,210 ,,
U.K.	11 ,,	22,453	19,148	17,695 ,,
Comparative Totals		148,989	118,391	119,258 ,,

Against the heavy increase, as shown above, in the American figures, the following heavy stock as under should be noted.

American Stocks, November 26th—

Sanchez	3,859 bags
Bahia	8,754 ,,
Venezuela	13,543 ,,
Arriba	12,379 ,,
Trinidad	2,801 ,,
Grenada	2,233 ,,
Others	13,064 ,,
Total	56,633 ,,
In 1908	26,876 ,,

London and Havre stocks stand thus:—

London, December 11th—	1909.	1908.
Trinidads	9,109	11,038 bags
Grenadas	11,464	5,308 ,,
Other W.I.	2,880	3,155 ,,
Ceylon and Java	19,598	12,194 ,,
Guayaquils	18,524	17,506 ,,
Brazil and Bahia..	2,230	1,019 ,,
African	9,439	11,577 ,,
Other Foreign	13,505	7,445 ,,
Total	86,749	69,242 ,,
Havre, November 30th—		
Pará	28,502	8,828 bags
Bahia	17,193	16,090 ,,
Venezuela	41,822	24,968 ,,
Trinidad	30,134	22,153 ,,
Other W.I.	3,303	6,909 ,,
San Thomé	7,202	2,715 ,,
San Domingo	22,639	27,534 ,,
Hayti	8,331	9,836 ,,
Accra	10,113	5,348 ,,
Guayaquil, &c.	29,431	25,918 ,,
Total	198,670	150,299 ,,

At the end of October the total stock in the United Kingdom was 8,792 tons, so it has fallen 860 tons in the month.

As the following prices show, the market on the whole remains steady, with a good demand for Trinidads and also for Grenadas when obtainable. Superior Bahias have touched 55s., but under exceptional circumstances, and the full market value cannot be put over 54s. Prices, including the public sales of December 14th, run as follows:—

Trinidads.—Middling to good red, 55s. to 56s.; fine marks, 57s. to 58s.

Grenadas.—Picked marks touched 56s.; good to fine, 54s. to 54s. 6d., and occasionally 55s.; common to fair, 51s. to 53s.

Dominica.—Unfermented, 48s. to 49s. 6d.; fair to good fermented, 50s. to 51s.

Jamaica.—Good red is worth about 52s. to 53s.

Costa Rica.—Bold bright, Granada character, realized 54s.; fair to good reddish, 50s. to 52s.

Ceylons.—Fine, 71s.; good bold, 60s. to 64s.; ordinary to fair medium, 54s. to 59s.

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